

3rd Annual Alaska Oil Spill Technology Symposium



March 22-24, 2016
Pipeline Training Center
Fairbanks Alaska

Welcome to the 3rd Alaska Oil Spill Technology Symposium

Welcome to the third, and we hope best yet, 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 for the past three years and helping to shape its direction. At the same time, we realize shrinking budgets are having significant impacts on our abilities to travel, so we want to ensure only the most useful events are competing for your time, attention, and money.

With the price of oil below \$30/barrel and budgets tighter than ever, we need to hear from you to see if the symposium provides sufficient return on investment to continue our efforts and justify your continued participation. Please take a moment to complete the short survey on the inside back cover of your pamphlet. You'll also notice blank lines beneath each abstract. Please use this space to share your thoughts about each topic. This isn't meant for critiquing presentations, rather a way to share ideas about ways to improve planning, prevention, and preparedness strategies in contingency plans.

We hope you'll leave this year's symposium with a better understanding of oiled wildlife response in Alaska. With that in mind, we've designed the first day to identify and describe: wildlife protection guidelines; the primary service providers and their services; who they rely on for support; and their facilities, capabilities, capacities, and response time-lines. The second day will feature results from whale hazing experiments, presentations about current oiled wildlife research in Alaska, a poster presentation session and technology showcase during lunch, and presentations about ongoing research and emerging response technology. Our final day will feature a tour of the Pipeline Training Facility, a mobile command post exhibition, and a simulated under ice oil recovery demonstration at a local lake.

As always, the organizers are grateful to the Oil Spill Recovery Institute, who generously sponsor each year's event, and we'd like to thank you, our speakers and guests, for joining us this year.



LT James Nunez
USCG



Dr. Richard Bernhardt
ADEC



Jessica Garron
UAF

Things to Enjoy While in Fairbanks

The Banks Alehouse: Please join us Tuesday evening (approx 4:30-7:30) at Banks Alehouse for a no-host reception, including food, drinks, and conversation! (1243 Old Steese Hwy).



University of Alaska Fairbanks Museum of the North: Discover Alaskan Native cultures, natural wonders, and diverse wildlife. Explore 2,000 years of Alaskan art, eons of Alaska's dinosaurs, and breathtaking gems, jewels, and mining displays. (\$10 per person for guests with AOSTS name tag; 907 Yukon Drive)

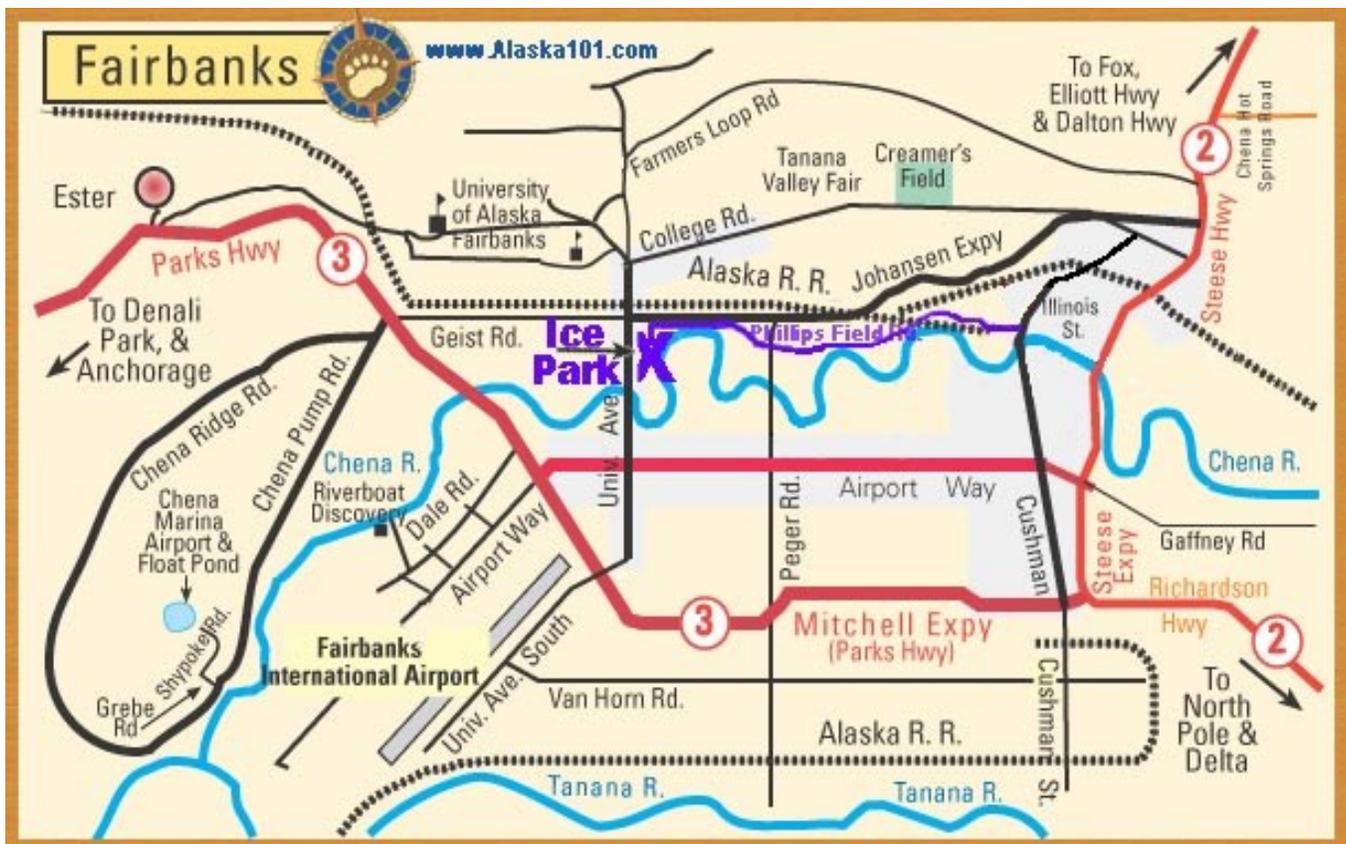


Hoodoo Brewing Co.: Just looking for a drink in true Fairbanksian style? Hoodoo Brewing Co. has fresh, well made craft beer, brewed in the heart of Alaska. (1951 Fox Ave.)

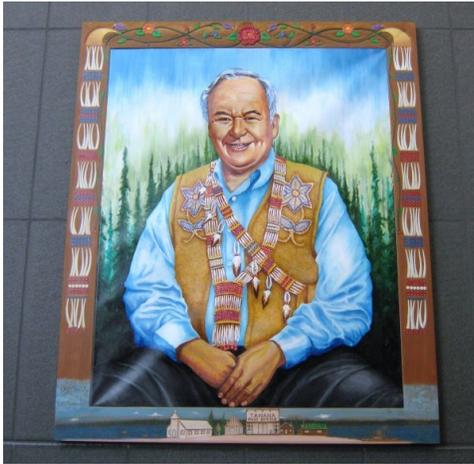
Hoodoo
BREWING CO



2016 BP World Ice Art Championships: See the finest annual ice art competition in the Western World! [\$12 per person for guests with an AOSTS name tag; \$8 per child (6-17); 3050 Phillips Field Rd; 10AM-10PM.]



Morris Thompson Cultural and Visitors Center: This extraordinary community centerpiece celebrates the people, land, and culture of Interior Alaska. Experience Alaska Native art, music, stories, and dance. (8AM-5PM; 101 Dunkel St.)



Silver Gulch Brewing & Bottling Co.: Enjoy the warm, inviting pub and restaurant at America's northernmost brewery. (2195 Old Steese Hwy. Fox, AK).



Ursa Major Distilling: Definitely a fun place, and a portion of their website is worth quoting. They provide ultra pure, premium handmade spirits in a relaxing and friendly atmosphere "in The People's Republic of Ester!" (2922 Parks Hwy)



3rd Annual Alaska Oil Spill Technology Symposium

March 22, 2016

09:00 Lt. James Nunez (USCG): Welcome to AOSTS

09:10 Dr. Philip Johnson (DOI): Wildlife Protection Guidelines for Alaska

09:45 Dr. Lori Verbrugge (USFWS): Polar Bear Response Plan for Polar bears in Alaska

10:05 Lee Majors (ACS): Arctic Wildlife Response Capabilities

10:35 BREAK

10:55 Kenneth Wilson (SERVS): Key Aspects of Wildlife Response Planning for Prince William Sound, Alaska

11:10 Dr. Randall Davis (International Wildlife Research): Contingency Planning and Response for an Oil Spill Involving Sea Otters and Other Fur-Bearing Marine Mammals in Alaska: History and Current Status

11:35 LUNCH

13:10 Dave Owing (SEAPRO): Southeast Alaska's Wildlife Response

13:30 Barbara Callahan (IBR): International Bird Rescue Oiled Wildlife Response

13:55 Dr. Carrie Goertz (Alaska Sealife Center): Alaska Sealife Center Capabilities

14:25 Jen Dushane (NMFS): Marine Mammal Stranding Network Roles, Responsibilities, and Expectations

14:45 BREAK

15:05 Dr. Olivia Lee (UAF): Industry Support in the Landscape of Marine Mammal Research

15:30 Kyra Mills-Parker (OWCN): California's Approach to Oiled Wildlife Response

3rd Annual Alaska Oil Spill Technology Symposium

March 23, 2016

08:00 Welcome Back

08:10 Dr. Lori Verbrugge (USFWS): ESA Section 7 Consultation

08:35 Lynne Barre (NOAA): Oil Spill Preparedness for Endangered Killer Whales

09:00 Catherine Berg (NOAA-SSC): ICS Wildlife Branch: Addressing Wildlife Injury from the Command Center

09:20 BREAK

09:40 Jeff Estes (TRG): Collector App Integration with WebIAP

10:00 Capt. John Sifling (Ret.) (CWater Solutions USA): Advanced Waste Water Treatment Technology

10:15 BREAK

10:35 Kurt Hansen (USCG): USCG Research for Responding to Oil Spills in Ice

11:00 Jessica Garron (UAF): UAS Applications for Spill Detection and Response

11:30 Technology Showcase Introduction

11:35 Technology Showcase and Poster Session During Lunch

13:40 Kerry Walsh (Global Diving): Neutron Backscatter Tank Scanning

14:00 Sam Vanderwaal (ACUASI): Use of UAS in Marine Mammal Surveying

14:20 BREAK

14:45 Jeremy Hale (GeoNorth): Commercial Satellite Imagery for Emergency Planning, Response, and Recovery Options

15:10 Boaz Ur (HARBO Technologies): A New Booming System for Immediate Containment at the Point of Failure—Impact on OSR Operations Efficiency

15:35 Nate Lamie (CRREL): CRREL Research Facilities and Oil Spill Mitigation Project Support

3rd Annual Alaska Oil Spill Technology Symposium

March 24, 2016

09:00 Chad Hutchinson: Pipeline Training Facility Tour

10:30 Earl Rose: Alyeska Mobile Command Post

11:30 Simulated Under Ice Oil Recovery (local lake)

12:15 Staggered Conclusion and Cleanup

Speaker Abstracts

Wildlife Protection Guidelines

Dr. Philip Johnson

Regional Environmental Officer

U.S. Department of the Interior

Office of Environmental Policy and Compliance

Anchorage, Alaska

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

The *Wildlife Protection Guidelines for Alaska* (Annex G) are part of the *Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases*. These guidelines outline the wildlife response process that is followed after the discharge of oil or release of a hazardous substance.

The guidelines describe the initial agency notification process, provide information on species of concern, and discuss the three types of wildlife response strategies (primary, secondary, and tertiary). The guidelines also include protocols and permitting requirements for unoiled wildlife deterrence, carcass collection, as well as the collection, holding and rehabilitation of live wildlife.

These guidelines are especially important because the coastline of Alaska and its offshore areas provide seasonal feeding, breeding, and staging grounds for millions of migratory birds and thousands of marine mammals. In some cases, the major portion of the world's population of a particular species may use these areas. Terrestrial and freshwater habitats also support a wide range of bird, mammal, and fish species. Moreover, these wildlife populations include important subsistence resources. Management of these species rests with federal and state wildlife resources agencies.

Oil Spill Response Plan for Polar Bears in Alaska

Dr. Lori Verbrugge and Susanne Miller

Environmental Contaminants/Spill Response Coordinator

U.S. Fish and Wildlife Service

Anchorage, Alaska

Speaker Biography

Dr. Lori Verrbrugge received her Ph. D. in Fisheries & Wildlife and Environmental Toxicology from Michigan State University, where she studied the toxicological effects of PCBs and dioxins in fish-eating birds. She moved to Alaska in 1997 to serve as an Environmental Public Health toxicologist for the Alaska Department of Health and Social Services, where she worked on a variety of contaminant issues. In 2010 she joined the U.S. Fish and Wildlife Service as a contaminants biologist; she currently works there as the Alaska Region's Oil Spill Response Coordinator

Abstract

In 2015, the U.S. Fish and Wildlife Service (USFWS) revised the *Oil Spill Response Plan for Polar Bears in Alaska*. This plan is consistent with Annex G ("Wildlife Protection Guidelines") of Alaska's Unified Plan, and provides additional detailed information specific to polar bears. The USFWS is the natural resource trustee for this species, and as such must authorize any response activities related to polar bears. Management guidance for polar bears is set forth in both the Marine Mammal Protection of 1972 and the Endangered Species Act of 1973 (ESA), under which the polar bear was listed as a threatened species in 2008. The Plan is available at <http://www.fws.gov/alaska/fisheries/contaminants/spill.htm>

Response activities for polar bear protection are classified into primary, secondary and tertiary strategies. Primary response involves keeping spilled oil away from polar bears, through mechanical and other spill response methods, and physical protection of areas most important to polar bears. Sensitive areas for prioritized protection include sites where bears feed, den, or rest, as well as any areas where bears are concentrated. Another important aspect of primary response is removal of oiled carcasses from the environment, so polar bears are not exposed to oil from ingestion of oiled animals. Secondary response is designed to prevent polar bears from entering oiled areas, through use of methods such as the designation of bear monitors, and use of deterrents to haze bears by pre-authorized, trained personnel. Tertiary response involves the capture, handling, transport, and treatment of oiled bears, and either their return to the environment or placement in a designated facility.

There are many challenges associated with rehabilitation of oiled polar bears, and the strategies included in the Plan have never been implemented during an actual spill. Nevertheless, the USFWS and multiple preparedness partners have developed protocols and acquired equipment to rehabilitate a small number of bears, which have been tested in field exercises. Rehabilitation equipment, including a polar bear holding module with three detachable compartments, is stored with Alaska Clean Seas in Deadhorse.

Arctic Wildlife Response Capabilities

Lee Majors

Planning and Development Manager

Alaska Clean Seas

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Phone: (907)659-3207

Speaker Biography

Lee Majors is a Planning and Development Manager for Alaska Clean Seas. In this position for the last 15 years he has managed the oil spill response training program, safety program, research & development program, permitting, development of the ACS Technical Manual, and been involved with improving wildlife response on the North Slope. Prior to ACS, Lee retired from the U.S. Coast Guard with 20 years of service of which 10 years was in marine safety and pollution response. He was also the Base Manager for the Navy Supervisor of Salvage Base at Fort Richardson, Alaska

Abstract

This presentation will outline the preparation and capabilities of Alaska Clean Seas in wildlife response on the North Slope of Alaska. This will include an overview of key pieces of equipment, critical permits, contracts with service providers, ACS's wildlife-related training program, and a description of activities conducted by the ACS Marine Mammal Response Working Group.

Key Aspects of Wildlife Response Planning for Prince William Sound, Alaska

Kenneth Wilson and Stacia Miller

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Fairbanks, Alaska 99706

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Abstract

Prince William Sound's contingency planning for wildlife response during an oil spill has evolved over the last 25+ years. Planning and training components have been developed through a collaborative approach between industry, trustee agencies, and wildlife experts. This program works because adequate funding is combined with the hard work and dedication of the people involved. The investment in training has produced a synergetic result by engaging local fishing crews in the role of hands-on wildlife rescue. The wildlife experts, in turn, learn about how things are done in the hands-on world of the fishermen. This local knowledge base, built on by the expert trainers, is an indispensable component of the program. As we train, practice on-water wildlife drills, and integrate with larger exercises, we learn more ways to make improvements, and our contingency plans become more realistic. This presentation will describe how wildlife has been integrated into the larger oil spill response structure, discuss lessons learned, and highlight the successes of breaking through the social and cultural barriers between environmental scientists, government agencies, responders, and local fishing vessel crews through a mutual desire to conserve wildlife.

Contingency Planning and Response for an Oil Spill Involving Sea Otters and Other Fur-Bearing Marine Mammals in Alaska: History and Current Status

Dr. Randall Davis¹, Williams TW¹, Tuomi PM¹, Wilson K², Miller S²

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Speaker Biography

Dr. Randall Davis is President of International Wildlife Research, Inc. and Regents Professor of Marine Biology and Wildlife and Fisheries Science at Texas A&M University. He began research on the effects of Prudhoe crude oil on the thermal conductance of sea otter fur in 1975 at Scripps Institution of Oceanography. The results from that study indicated that even light oiling would have marked detrimental effects on the thermoregulatory ability of sea otters and fur seals at sea (Kooyman, Davis and Castellini, 1977, In: *Fate and Effects of the Petroleum Hydrocarbons in Marine Organisms and Ecosystems*, Pergamon Press). In the early 1980s, he and colleague Dr. Terrie Williams began research on methods to mitigate the effects of oil on sea otters. Their results showed that Dawn detergent was effective in removing oil and enabled otters to restore the water repellency of their fur in 3-6 days with active grooming (Davis, Williams, Thomas, Kastelein and Cornell, 1988, *Canadian Journal of Zoology* 66:2782-2790). This method of cleaning fur-bearing marine mammals has changed little since 1988. On March 24, 1989, the Exxon Valdez spilt 11 million gallons of Prudhoe crude oil into Prince Williams Sound. The Dept. of Interior requested that R.W. Davis organize an oiled sea otter response on behalf of Exxon Corporation based on their knowledge from earlier research on techniques to clean oiled sea otters. In total, 357 oiled sea otters were captured of which 225 were rehabilitated and released. This was and remains today, the largest rehabilitation of oiled marine mammals, and the largest number of sea otters ever held in captivity. After the spill, Davis and Williams formed International Wildlife Research, Inc. and became the guaranteed responder for oiled sea otters in Prince William Sound for Alyeska/SERVS. They also provide OSHA certified training for responders working in the Alyeska/SERVS Oiled Sea Otter Rehabilitation Facility located on the terminal property in Port Valdez and personnel on capture vessels. IWR currently has over 100 trained personnel that can respond in less than 72 hours.

Abstract

The largest oil spill in the United States occurred in Maricopa, California in 1910 releasing 378 million gallons on land. The spill lasted more than a year, from March 14, 1910 until September 10, 1911, and only ceased after the well collapsed, leaving a crater in the desert surrounded by layers of oil the consistency of asphalt. By comparison, the Deepwater Horizon spill in the Gulf of Mexico in 2010 released an estimated 206 million gallons. The first recorded marine spill in the Alaskan Arctic occurred in August 1944 when the U.S. Navy cargo ship S.S. *Johanthan Harrington* grounded on a sandbar near Barrow, Alaska. To refloat the vessel, about 25,000 gallons of oil were deliberately spilled into the Beaufort Sea killing seals and birds.

It was not until the 1969 Santa Barbara oil spill that occurred during drilling from an offshore platform that the U.S. Department of the Interior began to recognize the need for *scientific research* on the effects of petroleum hydrocarbons on animals, especially marine mammals and seabirds. Approximately 3.8 million gallons of crude oil were released, and an estimated 3,500 sea birds were killed as well as an unknown number of elephant seals, sea lions and possibly some cetaceans. This seminal event led to the modern environmental movement and creation of the U.S. Environmental Protection Agency (EPA, 1970), the National Environmental Policy Act (NEPA, 1970) and the Clean Water Act (1972).

Contingency Planning and Response for an Oil Spill Involving Sea Otters and Other Fur-Bearing Marine Mammals in Alaska: History and Current Status

Abstract (continued)

In the mid-1970s, the Bureau of Land Management and NOAA began funding research on the possible environmental effects of petroleum development on the Alaskan continental shelf managed by the Outer Continental Shelf Environmental Assessment Program (OCSEAP).

An essential responsibility of the Outer Continental Shelf Leasing Program was to ensure that petroleum drilling and production would not irreparably damage the marine environment. As part of this effort, the first study of the thermal conductance of sea otter pelts after oiling with Prudhoe crude oil was funded. The results from this study indicated that even light oiling would have marked detrimental effects on the thermoregulatory ability of sea otters and fur seals at sea (Kooyman, Davis and Castellini, 1977, In: Fate and Effects of the Petroleum Hydrocarbons in Marine Organisms and Ecosystems, Pergamon Press). In the late 1970s, experiments were conducted to assess the effects of oiling on sea otter behavior and metabolic rate. The results indicated that even small amounts of oiling increased the grooming behavior of sea otters and that, without cleaning, the effects of oil exposure could be lethal (Siniff et al., 1982, Biological Conservation 23:261-272). The authors concluded with this prescient statement: "With the recent completion of the Trans-Alaskan pipeline, oil contamination to Alaskan coastal waters seems inevitable. A large population of sea otters in Prince William Sound, the southern terminus of the Alaskan pipeline, invites large-scale effects from such a spill."

In the early 1980s, the Minerals Management Service, U.S. Dept. of the Interior which managed the nation's natural gas, oil and other mineral resources on the outer continental shelf, began funding research on methods to mitigate the effects of oil on sea otters. Sea otter pelts were oiled and cleaned with a variety of detergents. The results showed that Dawn dish washing detergent was very effective in removing oil from fur (Williams, Kastelein, Davis and Thomas, 1988, Canadian Journal of Zoology 66:2776-2781). In 1985, sea otters from Prince William Sound were brought to Hubbs Marine Research Institute in San Diego, and 20% of their body surface was oiled and then cleaned. The results showed that Dawn detergent was effective in removing oil and enabled otters to restore the water repellency of their fur in 3-6 days with active grooming (Davis, Williams, Thomas, Kastelein and Cornell, 1988, Canadian Journal of Zoology 66:2782-2790). This method of cleaning fur-bearing marine mammals has changed little since 1988.

On March 24, 1989, the Exxon Valdez spilt 11 million gallons of Prudhoe crude oil into Prince William Sound. Exact numbers are not known, but an estimated 5,000 sea otters and 30,000 seabirds were killed. At the time, there were no contingency plans, rehabilitation facilities or trained responders for oiled sea otters, but at least we had a proven protocol for cleaning the otters. Pamela Bergman from the Dept. of Interior requested that R.W. Davis and T.W. Williams organize an oiled sea otter response on behalf of Exxon Corporation based on their knowledge from earlier research on techniques to clean oiled sea otters.

The 1989 Valdez sea otter rehabilitation facility was built initially in a Prince William Sound Community College dormitory, and the first oiled sea otters arrived on March 30. This facility was inadequate for the large number of oiled otters that soon arrived, so construction began on a larger facility in the gymnasium of the Growden-Harrison elementary school (now part of the Prince William Sound Community College). The rehabilitation program moved into the new facility on April 6. Cleaning tables, holding pens and pools were built on site. Seawater, which was stored in two fiberglass reservoirs, was pumped into the pen pools. ATCO trailers were brought in for a veterinary clinic and office space. Offsite buildings were rented for holding frozen seafood for the otters and as necropsy facility. An additional rehabilitation facility was built in Seward and a pre-release facility in Homer. Personnel working at the three facilities reached a peak of about 225 by early May, and over 300 people ultimately participated. In the end, 357 oiled sea otters were captured of which 225 were rehabilitated and released. This was and remains today, the largest rehabilitation of oiled marine mammals, and the largest number of sea otters ever held in captivity.

Contingency Planning and Response for an Oil Spill Involving Sea Otters and Other Fur-Bearing Marine Mammals in Alaska: History and Current Status

Abstract (continued)

After the Valdez spill, R.W. Davis and T.W. Williams edited a book which incorporated the rehabilitation, veterinary, administrative and building techniques, protocols and lessons from the Valdez spill (Williams and Davis, 1995, Emergency Care and Rehabilitation of Oiled Sea Otters; A Guide for Oil Spills Involving Fur-bearing Marine Mammals; University of Alaska Press, Fairbanks, 279 pp). Subsequently, Alyeska requested that Davis and Williams prepare oil spill contingency plans for sea otters in Prince William Sound. International Wildlife Research, Inc. (IWR) was formed by Davis and Williams which became the guaranteed responder for Alyeska/SERVS. Under Federal and State Law, IWR must respond to an oil spill in Prince William Sound within 72 hours with trained and OSHA certified responders for up to 200 oiled sea otters. To meet this requirement, IWR in conjunction with Alyeska/SERVS, provides annual training for wildlife responders. The training includes web based instruction (www.wildliferesearch.com) and an annual, one day OSHA course in Anchorage that provides volunteers with an 8-hour, First Responder Certificate. The roster currently has over 100 trained personnel that can be on site in less than 72 hours.

The current Alyeska/SERVS Oiled Sea Otter Rehabilitation Facility is located on the terminal property in Port Valdez. This modular facility has a flow through design to handle up to 200 sea otters. The design is based on the lessons from the 1989 Valdez spill and is capable of full operations in 72 hours. Also on site are mobile modules that can be taken to the spill site for oiled sea otter stabilization before the animals are transported to the rehabilitation facility in Port Valdez. Finally, IWR provides training to personnel with fishing boats that have contracted with Alyeska/SERVS to assist in oiled sea otter capture and transport to the rehabilitation facility. In total, this is the largest and most comprehensive oiled marine mammal response plan in the country and probably the world. It is the culmination of 40 years of scientific research, detailed contingency planning, extensive experience and dedication by IWR and Alyeska/SERVS.

Southeast Alaska's Wildlife Response

David Owing

General Manager

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Speaker Biography

David serves as the General Manager of the Southeast Alaska Petroleum Resource Organization (SEAPRO) where he is the principal administrative, operating, and technical executive, controlling all aspects of the development and operation of the corporation.

Prior to joining SEAPRO in 1996, David spent 5 years as a Master Marine Spill Responder for the Marine Spill Response Corporation (MSRC), and has worked in all levels of emergency response operations. David has 18 years of experience in the Fire Service, and worked for 5 years as a member of the Hazardous Materials Response Team with the Subase Bangor Fire Department in Silverdale, Washington.

David is a Certified Environmental Safety & Health Trainer. He serves on the Greater Ketchikan Area Local Emergency Planning Committee. He also serves as the secretary for the Association of Petroleum Industry Co-Op Managers and on the ASTM F20 Hazardous Substances and Oil Spill Response Committee. David received his Bachelors Degree from the University of Washington in 1982.

International Bird Rescue Oiled Wildlife Response

Barbara Callahan

Response Services Director

Regional Representative, Alaska

International Bird Rescue

Email: barbara.callahan@bird-rescue.org

Speaker Biography

Barbara Callahan joined International Bird Rescue in 1997 and is Response Services Director and the Alaska Regional Representative. She holds a Bachelor of Science degree in Biological Science from the University of Alaska Anchorage, where her studies included avian hematology and microbiology. Barbara has been a wildlife rehabilitator since 1991 when she started working at a local wildlife center specializing in raptors and other birds.

During her nearly 20 years at International Bird Rescue, Barbara has helped manage many large-scale oiled wildlife responses in several countries, including managing over 20,000 oiled penguins in South Africa, and been part of oiled wildlife response planning, training and rescue in many countries around the world. Barbara holds certificates in ICS and has held various command center positions including Wildlife Branch Director and during the Gulf of Mexico spill was the Deputy Bird Unit Leader for the theater of operations. Barbara was recently the Wildlife Coordinator at the Rena Spill, overseeing the Wildlife Response in New Zealand.

Abstract

International Bird Rescue has been responding to oiled wildlife throughout the world for over 45 years and has worked to continually improve the field of oiled wildlife response through research, response experience, exercises and through our aquatic bird rehabilitation program that cares for over 7,000 aquatic birds annually. In Alaska, we have pioneered the field of Search and Collection of oiled wildlife during catastrophic spills and successfully managed oiled wildlife responses in very remote areas.

Today, IBR stands ready to respond to oiled wildlife in Alaska through contract agreements with the OSROs, oil industry and government. IBR maintains a turn-key facility in Anchorage that serves the state with a fully-equipped facility that can be activated within minutes. This presentation will cover past responses in Alaska, as well as current plans for oiled wildlife response throughout the State.

Alaska Sealife Center Capabilities

Dr. Carrie Goertz

Staff Veterinarian

Alaska Sealife Center

Email: carrieg@alaskasealife.org

Speaker Biography

I was born in Washington DC but grew up in Chevy Chase, Maryland. At Lehigh University in Pennsylvania, I received an Air Force ROTC scholarship and obtained a degree in Electrical Engineering and thought that I was done with school. I was in the Air Force for seven years and obtained a master's degree in Engineering Management from the University of Dayton, Ohio. After I left the Air Force, I decided to pursue a veterinary degree. What intrigued me about medicine was the same thing that intrigued me about engineering, namely understanding how things worked. While I picked up required prerequisites and a second bachelor degree in Biology at the University of Massachusetts at Boston, I also volunteered at a local zoo and worked part time for the Wildlife Clinic at Tufts Veterinary School. My first blood drawing experience was in the field, sampling colonial nesting birds. I traveled across the country to attend veterinary school at Washington State University but also pursued external aquatic animal experiences, attending AquaVet at Wood's Hole and doing an externship at Point Defiance Zoo and Aquarium. After graduation, I moved back to the east coast and did a two year aquatic animal internship at Mystic Aquarium in Connecticut. At the University of New England in Biddeford, Maine I helped start a new stranding center for marine mammals and later at the University of Southern Maine I developed marine mammal cell cultures and investigated the effects of heavy metals on those cells. Wanting to return to spending more time working with whole animals and not just their cells, I crossed the country once again to accept a job at the Alaska SeaLife Center. As the Staff Veterinarian I assist with the preventative medicine program, research projects, and clinical care for birds, fish, and marine mammals including both captive and stranded animals.

Marine Mammal Stranding Network Roles, Responsibilities, and Expectations

Jen Dushane

Alaska Ecological Research

National Marine Fisheries Service's

Speaker Biography

Jen Dushane is a wildlife biologist specializing in the marine mammal field. Through her small consulting company, Alaska Ecological Research, she helped develop NMFS' Arctic Marine Mammal Disaster Response Guidelines through a collaborative effort with Arctic coastal communities, other state/federal agencies, industry, OSRO's and the Alaska Marine Mammal Stranding Network members. Other research projects have focused on Cook Inlet beluga strandings, traditional knowledge of marine mammals and sound, and other policy/permitting work.

Abstract

With shipping and oil and gas activities increasing in the Arctic National Marine Fisheries Service's Protected Resources Division spearheaded the development of a guidance document to map out the agency's strategy for oil spill (and other disaster) response in that region. The Arctic represents a tremendous logistical challenge to wildlife response with a small, primarily subsistence-based human population, few available facilities for wildlife rehabilitation, and limited lodging, transportation and supply options. Focusing on communication with Arctic communities and other stakeholders, the "Arctic Marine Mammal Disaster Response Guidelines" describes existing expertise (including the Alaska Marine Mammal Stranding Network) and equipment, and identifies measures still needed to mount an effective marine mammal response. Development of this guidance document included meeting with northern Alaska community stakeholders in person or via teleconference to create regionally specific and culturally sensitive response strategies. Input on communication and response protocols for carcass collection, de-oiling, tissue sampling, necropsies, and subsistence food concerns was integrated. This presentation provides an overview of the Guidelines, with a focus on the involvement of the Alaska Marine Mammal Stranding Network.

Industry Support in the Landscape of Marine Mammal Research

Dr. Olivia Lee

Alaska Ecological Research

National Marine Fisheries Service's

Speaker Biography

Olivia Lee is Research Assistant Professor at the International Arctic Research Center at the University of Alaska Fairbanks. She has a PhD in Wildlife and Fisheries Sciences from Texas A&M University and has experience working in marine environmental policy with an emphasis on marine mammal interactions with seismic research at the National Science Foundation. She studies primarily marine mammal behavior ecology, and currently collaborates with Alaska coastal communities to improve observations of marine mammals in a changing sea ice habitat. She is also working with the North Slope Science Initiative in a scenarios project to consider the research and monitoring needed in the context of potential future development activities on the North Slope and adjacent seas.

Abstract

As sentinels of change and keystone species, marine mammals represent an important ecosystem component in Alaska. However, research on marine mammals to support building baseline data, and to improve understanding of potential interactions with industry remains logistically complex and relatively expensive. Marine mammal monitoring research often requires multi-collaborative efforts to be successfully implemented. Fluctuations in the funding environment can threaten the sustainability of uninterrupted marine mammal research and monitoring in Alaska, and the value of many long-term datasets are underappreciated. Over the last three decades a combination of ongoing and potential, new industry activities have supported a vast array of important marine mammal research and monitoring activities. A review of these industry-supported studies focused in the Alaska Arctic is presented to highlight the value that such contributions have provided over the years and some recommendations for moving forward are suggested.

California's Approach to Oiled Wildlife Response

Kyra Mills-Parker

Deputy Director-Field Operations

Oiled Wildlife Care Network

Karen C. Drayer Wildlife Health Center

One Health Institute

University of California , Davis

Speaker Biography

Kyra has worked at the Oiled Wildlife Care Network, UC Davis since 2010, and her current position is Deputy Director – Field Operations. She earned her Masters degree from the University of California Irvine, where she studied Galápagos Penguin diving behavior and foraging ecology of seabirds in the inshore waters of the Galápagos Islands. As a staff biologist for PRBO Conservation Science's Marine Division (1999-2003), Kyra edited the California Current Marine Bird Conservation Plan, served as lead seabird biologist on the Farallon Islands, and was a member of the Wildlife Processing Unit personnel for oil spill response. Since 2008 she has been a staff biologist with the Farallon Institute for Advanced Ecosystem Research, and before joining the Oiled Wildlife Care Network she was a member of the biology faculty at the University of New Mexico.

Abstract

In the past 50 years, oil spills have repeatedly been observed to be responsible (either directly or indirectly) for the killing of large numbers of seabirds. Invariably, however, each large spill that occurs often generates heated discussions within the scientific community regarding the validity of capturing and providing rehabilitative care to individual oiled animals. During this time period, there have been many improvements and successes in oiled bird care reported from the rehabilitation community, but the practice remains time-consuming, labor-intensive, and costly, and many believe that rescuing and rehabilitating impacted seabirds remains an exercise to appease the demanding public and has little conservation value at the population level. The Oiled Wildlife Care Network (OWCN), established in 1994, works closely with the California Dept. of Fish and Wildlife, Office of Spill Prevention and Response, and its mission is to provide best achievable capture and care to oiled wildlife within the state of California. The OWCN is a statewide collective of trained wildlife care providers, regulatory agencies, academic institutions and wildlife organizations working collaboratively to rescue and rehabilitate oiled wildlife in California. This presentation will include a brief history of the factors that led to the formation of the OWCN, as well as its role for oiled wildlife response within California.

ESA Section 7 Consultation

Dr. Lori Verbrugge and Sadie Wright (National Marine Fisheries Service)

Environmental Contaminants/Spill Response Coordinator

U.S. Fish and Wildlife Service

Anchorage, Alaska

Abstract

The Endangered Species Act of 1973 (ESA) provides protection for species listed under the Act, and for their designated critical habitat. Section 9 of the ESA prohibits “take” of individual animals or adverse modification or destruction of their critical habitat. “Take” is legally defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct”. Species can be listed under the Act as either “endangered” (in danger of extinction throughout all or a significant portion of its range) or “threatened” (likely to become endangered within the foreseeable future).

Under Section 7 of the ESA, it is the responsibility of all federal agencies to conserve ESA-listed species, and to use their authorities to further the purposes of the Act. Federal agencies must ensure that their actions do not jeopardize the continued existence of a species or their critical habitat. Thus, the federal action agency must determine whether any action that they conduct, fund, or authorize could have an adverse effect on a listed species, and consult with the appropriate Service (NMFS or U.S. Fish and Wildlife Service, depending on the species). Section 7 consultations vary in their timelines and complexity depending on whether they are Informal or Formal consultations. Formal consultations are required if the proposed action is “likely to adversely effect” a listed species or its critical habitat (i.e., if take is expected).

During an emergency such as an oil spill, emergency Section 7 consultation is performed on an expedited timeframe to quickly get feedback from the Services as to whether response actions may jeopardize the continued existence of a species, and to obtain the Service’s suggested mitigation measures to minimize impacts on listed species or their critical habitat. In Alaska, the Services have developed an Emergency Consultation Form to facilitate this process. If response activities do result in take, a formal consultation will be required once the emergency has passed, to document and quantify the impact of the response on listed species and their critical habitat.

Oil Spill Preparedness for Endangered Killer Whales

Lynne Barre

Marine Biologist/Seattle Branch Chief

Protected Resources Division

National Oceanic and Atmospheric Administration

7600 Sand Point Way, NE

Seattle, WA 98115

Email: lynne.barre@noaa.gov

Speaker Biography

Lynne has been with the Protected Resources Division in Seattle for over ten years implementing the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA). Since 2003 she has worked on the endangered listing of the Southern Resident killer whales, designated critical habitat, developed and finalized a Recovery Plan and has implemented actions to conserve and recover the whales. In addition to the killer whale program Lynne supports other aspects of the marine mammal program, such as helping coordinate the stranding network. Lynne also works on ESA-listed rockfish species and coordinates with Puget Sound salmon recovery efforts.

My background is in marine mammal research, particularly with bottlenose dolphins. I have a degree in Biology from Georgetown University and completed a Master's degree in Animal Behavior at San Diego State University. After graduate school I worked on a variety of research projects in Shark Bay, Western Australia where I studied social behavior, mothers and infants, and genetic relationships of the local dolphins and assisted with research on sea turtles and tiger sharks. Before joining NOAA, I worked with the Crittercam team at National Geographic, putting underwater cameras on marine animals to learn about their lives under the surface. I spent two years in NOAA's Office of Protected Resources in Silver Spring, MD before coming to the West Coast.

Abstract

Southern Resident killer whales are a small population of less than 90 whales and were listed as endangered in 2005. All of the Southern Residents are periodically in the same location at the same time (known as a "super pod"), making the whales very vulnerable to a catastrophic event like an oil spill that could impact the entire population at one time. Many efforts are underway to prevent oil spills and prevention is key, however, the Southern Residents live in a busy urban environment with heavy shipping traffic and risk from an oil spill remains. As part of our recovery program, NOAA Fisheries has developed response plans to reduce the impacts of a spill on this endangered population.

NOAA Fisheries worked closely with partners to develop a killer whale-specific oil spill response plan. Together with the University of California at Davis, we hosted a workshop with researchers, oil spill responders, and oil industry representatives and developed a draft oil spill response plan for killer whales. Working with the Washington Department of Fish and Wildlife, the Region 10 Regional Response Team and the Northwest Area Committee, we completed the plan, and it was adopted in 2010 as part of the Northwest Area Contingency Plan. Helicopter hazing, banging pipes (oikomi pipes), and underwater firecrackers are on the short list of options. Our implementation plans for these hazing methods includes strict safety instructions about how close to get and how to implement these deterrents in order to prevent injury of oil spill responders and the whales. Since finalizing the response plan, we've been focused on securing equipment, learning more about the techniques, and practicing them during oil spill drills.

Oil Spill Preparedness for Endangered Killer Whales (continued)

ICS Wildlife Branch: Addressing Wildlife Injury from the Command Center

Catherine Berg

Scientific Support Coordinator, Alaska

Office of Response and Restoration

Emergency Response Division

National Oceanic and Atmospheric Administration

Speaker Biography

Catherine is a Fish and Wildlife Biologist. She joined NOAA's Office of Response and Restoration Emergency Response Division in 2013. As the Scientific Support Coordinator for Alaska, she serves as a principal technical adviser to the FOSC during spill response. Prior to that, Catherine worked for the U.S. Fish and Wildlife Service in Alaska for 30 years, serving much of that time in the Environmental Contaminants Division, focusing on natural resource damage assessment and oil spill response issues. She was also the USFWS Alaska Regional Spill Response Coordinator for wildlife response. Her first spill was the Exxon Valdez oil spill and she has been part of the Alaska spill response and planning community ever since.

Abstract

The Wildlife Branch is located within the Operations Section of an Incident Command System. Most of us know that. But because most “everyday” spill responses do not involve injured wildlife, very few responders have had an opportunity to work with or within a Wildlife Branch and many are unfamiliar with how wildlife issues are dealt with in the Command Center. This paper will present the roles and responsibilities of a Wildlife Branch and some examples of organizational structure. It will look at the information, resources, and support that the Wildlife Branch needs to do its job and who provides these elements. It will discuss the “products” that the Wildlife Branch provides and the “customers” to whom they are provided. Finally, it will explore qualities of a good wildlife protection plan needed to execute a successful Wildlife Branch operation.

Collector App Integration with WebIAP

Jeff Estes

The Response Group

About TRG

The Response Group (TRG) is the industry leader in Crisis Management and Emergency Response with a depth of combined experience in the oil and gas, chemical, and emergency response industries. TRG provides quality products and services with a suite of emergency response software and services from plans to actual response support. Through the appropriate and accurate implementation of technology, regulatory interpretation, and creativity, we shall provide practical and cost effective solutions to the full spectrum of our clientele. We will make every effort to exceed expectations and ensure success to all parties.

Advanced Waste Water Treatment Technology

Captain John Sifling (Ret.)

Security, Safety and Environmental Consulting

Broad Reach Maritime

Speaker Biography

John Sifling has over 30 years experience as a maritime professional and has held executive level positions in both the public and private sectors. He holds a Bachelor of Science in Marine Science from the U.S. Coast Guard Academy and Master of Science in Oceanography (Physical) from the University of Rhode Island.

A retired Coast Guard Commander, John devoted a career to the U.S. Coast Guard's Marine Safety program. He served in a variety of assignments including Commanding Officer of Marine Safety Office Juneau, and was Captain of the Port, Federal On Scene Coordinator, Officer in Charge of Marine Inspection, and Federal Maritime Security Coordinator for Southeast Alaska. After retiring from the Coast Guard, John worked for nearly eight years as Vice President, Fleet Security and Company Security Officer at Princess Cruises, one of the largest cruise lines in the world.

John now owns Broad Reach Maritime (www.broadreachmaritime.com), a consulting firm located in Pasadena, California, offering services such as: risk assessment, incident management, strategic planning, policy development, spill management team support, training and exercise planning, regulatory agency coordination, audits/inspections, and expert witness. His clients include CWater Solutions USA (www.cwatersolutionsusa.com), a company providing advanced waste water treatment services.

USCG Research for Responding to Oil Spills in Ice

Kurt Hansen

Acquisition Directorate

Research and Development Center

U.S. Coast Guard

Speaker Biography

Kurt Hansen has worked at the US Coast Guard (USCG) Research and Development Center in New London since 1993, working on projects dealing with oil spill prevention and response since 1998. He previously served as a sonar engineer and qualified US Navy SCUBA diver at the Naval Undersea Warfare Center, formerly in New London and has over 34 years of government service.

He has an MS in Ocean Engineering from the University of Rhode Island and a BS in Mechanical Engineering from the University of Delaware.

During the Deepwater Horizon Response, he served on the Alternative Response Technology Evaluation Team at the command post in Houma, LA. He is a member of ASTM Committee F-20 on Committee F20 on Hazardous Substances and Oil Spill Response and one of the USCG Representatives to the National Response Team (NRT) Science and Technology Committee. He is also a member of the Marine Technology Society and American Society of Mechanical Engineers.

UAS Applications for Spill Detection and Response

Jessica Garron

Senior Science Consultant

Office of the Vice Chancellor for Research and the Alaska Satellite Facility

University of Alaska Fairbanks

Speaker Biography

Jessica Garron is a Senior Science Consultant with the University of Alaska Fairbanks, Office of the Vice Chancellor for Research and the Alaska Satellite Facility. Garron works with researchers, and partners in government and industry, to coordinate experiments that fill gaps in Arctic oil spill research. Last year she was the Project Coordinator for two Arctic Response Technology Joint Industry Programme projects sponsored by the International Association of Oil and Gas Producers the second of which, Field Testing at a Manmade Basin near Fairbanks, AK, she will discuss with us today.

Jessica's research is focused on synthetic aperture radar (SAR) integration into oil spill operations, advancing data access projects and expanding radar applications in decision-making processes. A significant component of this research is the usability of remote sensing technologies in an operational setting to support oil spill response and monitoring in the Arctic. When not working on oil and gas related research she spends her time discussing permafrost, and the effect of a changing climate on permafrost, with her neighbors across Alaska.

Abstract

Remote sensing technologies for detecting and responding to oil spills are quickly advancing. Unmanned aerial systems (UASs) are rapidly rising platforms on which a number of observational sensors can be carried as payload. These vehicles and sensors are relatively easy to deploy, and allow for detection and mapping of oil spills to aid decision-makers on how to manage resources during a response. Other UAS payloads are under development for direct use in an oil spill response, and are leading the way in how we can consider using these technologies in the future. This presentation will highlight recent developments in the use of UAS in oil spill detection and response.

Neutron Backscatter Tank Scanning

Kerry Walsh

Marine Casualty Project Manager

Salvage Master

Global Diving & Salvage, Inc.

Speaker Biography

Kerry Walsh serves Global as a Salvage Master and Marine Casualty Project Manager. He has more than 30 years of experience in the maritime industry centered around broad spectrum marine salvage and commercial diving operations. Mr. Walsh's project management experience includes salvage, wreck removal, pollution mitigation, ship husbandry, ship repair, underwater construction, survey and inspection. Notable projects include the deep water tank truck recovery operation conducted in Robson Bright, the oil recovery from the Princess Kathleen, the deep water assessment of the Montebello and the recovery of the F/V Deep Sea, foundered in the sensitive waters of Whidbey Island, Washington.

Use of UAS in Marine Mammal Surveying

Sam Vanderwaal

Systems Integration & Engineering

Alaska Center for Unmanned Aircraft System Integration—RDT&E

University of Alaska Fairbanks

About ACUASI

The Alaska Center for Unmanned Aircraft Systems Integration - RDT&E, or ACUASI, was established in December 2012 by the University of Alaska Board of Regents in recognition of the importance and growth of the unmanned aircraft program. It was established under the University of Alaska Fairbanks in the Geophysical Institute where it originated but was given the role of leading all unmanned aircraft programs for the entire system. It was also tasked to pursue opportunities with the FAA such as the FAA test sites. The program originated in 2001, and over the years had expanded its scope, the equipment it operated, and the variety and complexity of research projects it executed. In 2013 ACUASI submitted its proposal to the FAA for one of the six test sites established by the 2012 FAA Modernization and Reform Act, and in December 2013 the FAA announced that the University had been selected. The Pan Pacific UAS Test Range Complex reports to the ACUASI, but also includes principal partners in Oregon and Hawaii as well as 56 non-state partners located all over the US and internationally. Ranges are located in the three states as well as in Iceland, our key international partner.

Commercial Satellite Imagery for Emergency Planning, Response, and Recovery Operations

Jeremy Hale

Director of Geospatial Development

GeoNorth, LLC

Speaker Biography

Jeremy Hale is the Director of Geospatial Development for GeoNorth, LLC; he is responsible for providing valuable counsel and innovative solutions to government, energy, environmental, and natural resources sectors. Jeremy has significant expertise in the critical issues affecting these areas as well as extensive knowledge of the earth observations satellites systems. Jeremy lives in Anchorage, Alaska and has been working in remote sensed mapping field for more than 16 years. Jeremy has a diverse background in CAD, GIS and Imagery. Over the last 15 years Jeremy has managed some of the largest and most complex commercial mapping projects in North America

Abstract

Over the last several years we have seen an increased interest in the use of high-resolution Earth-observation satellites (EOS) capacities in the service of local, national and international response to major disaster situations, humanitarian relief efforts, and civil security issues. Maps, geospatial information, and thematic analysis derived from satellite imagery can support decision making and situation awareness during all phases of the disaster and crisis cycle. This is defined through preparedness, alertness, rapid analysis, response, recovery, and reconstruction. During the analysis, response, and recovery phases, only rapid delivery of accurate and comprehensive imagery analysis can help to assess large disaster situations, particularly in remote areas such as Alaska, where other means of assessment or mapping are unavailable or insufficient. Satellite imagery is often outdated when timely disaster and crisis-management decisions are required to support immediate response activities.

GeoNorth will discuss how their unique ability to collect, downlink, and deliver near real time optical and radar imagery within a few hours of receiving requests can support clients with Emergency Planning, Response and Recovery Operations during disasters and risk management. GeoNorth offers the ability to task and downlink directly from Airbus DS optical and radar satellites, including Pleiades (50cm), SPOT 6/7 (1.5m), and TerraSAR-X (25cm – 40m) satellites.

A New Booming System for Immediate Containment at the Point of Failure—Impact on OSR Operations Efficiency

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's site. In the meantime, the oil slick spreads, splits and travels up to tens of miles per day. At this stage, the disastrous consequences are practically inevitable, despite the efforts of the 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 will be pre-installed at standby positions on-board ships, tankers, rigs coastal infrastructure facilities, ports and marinas, oil terminals and sensitive pipelines. It will start deploying within minutes of spill detection by a local, two person crew

The system will be comprised of a compact vessel, the size of a lifeboat, equipped with a device that deploys the boom for immediate containment. The deployment vessel will contain the spill quickly and attach a homing/GPS device to the boom, so the response teams will be able to locate it easily. The thick layer of oil will be 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 layer will be thicker and won't be able to spread and split. The marine and coastal environments will benefit greatly.

The presentation will include technical specifications of the system as well as results of testing off-shore and at OHMSETT

CRREL Research Facilities and Oil Spill Mitigation Project Support

Nathan Lamie

Electronics Engineer

Engineering Research and Development Center

Cold Regions Research and Engineering Laboratory

Speaker Biography

Mr. Lamie serves as an Electronics Engineer for the Engineering Research and Development Center (ERDC) at the Cold Regions Research and Engineering Laboratory (CRREL) in Hanover, NH. He conducts basic and applied research studies focusing on electromagnetic wave propagation and ground penetrating radar techniques. Specific areas of study include electromagnetic detection of munitions; infrared spectroscopy of vegetation in remote areas; and crevasse detection in the Arctic utilizing ground penetrating radar. Mr. Lamie facilitates the execution of a number of oil spill related projects that utilized the unique cold climate, ice engineering facilities on the CRREL campus in Hanover, NH.

Abstract

Engineers with the U.S. Army Engineer Research and Development Center (ERDC) are collaborating with test partners that include private companies, government agencies, and educational institutions to enhance and evaluate techniques to detect and mitigate oil spills in and under ice. The Cold Regions Research and Engineering Laboratory (CRREL) offers a unique set of scientific research facilities for controlled, cold environment, long- and short-term studies in both Fairbanks, Alaska and the facility in Hanover, NH. Facilities and monitoring projects of particular interest for oil spill mitigation and detection will be presented.

Poster Abstracts

Applications of Lipschitz Regularity and Multiscale Techniques for the Automatic Detection of Oil Spills in Synthetic Aperture Radar (SAR) Imagery

Olaniyi A. Ajadi⁽¹⁾, Franz J. Meyer⁽¹⁾⁽²⁾, Marivi Tello⁽³⁾

⁽¹⁾Geophysical Institute, University of Alaska Fairbanks, P.O. Box 757320 Fairbanks, AK 99775

⁽²⁾Alaska Satellite Facility, University of Alaska Fairbanks

⁽³⁾German Aerospace Center (DLR)

This research presents a promising new method for the detection of oil spills from SAR data. The method presented helps to overcome some common performance limitations of SAR-based oil spill detection. Principal among these limitations are: 1) the inhomogeneous properties of the sea surface can show areas with lower radiometry, when the wave slopes are not oriented to the sensor and this makes it difficult to discriminate between oil spills and look-alikes; 2) the multiplicative speckle statistic associated with SAR images limits oil spill detection performance

In this paper, we introduce two novel image analysis techniques to largely mitigate the aforementioned performance limitations, namely Lipschitz regularity (LR) and Wavelet transforms. We used LR, an image texture parameter akin to the slope of the local power spectrum, in our approach to mitigate these limitations. We show that the LR parameter is much less sensitive to variations of wind and waves than the original image amplitude, lending itself well for normalizing image content. We also show that the LR transform enhances the contrast between oil-covered and oil-free ocean surfaces and therefore improves overall spill detection performance. To calculate LR, the SAR images are decomposed using two-dimensional continuous wavelet transform (2D-CWT), which are furthermore transformed into Holder space to measure LR. Finally, we demonstrate that the implementation of wavelet transforms provide additional benefits related to the adaptive reduction of speckle noise.

We show how LR and CWT are integrated into our image analysis workflow for application to oil spill detection. We applied our method to simulated SAR data of wind driven oceans containing oil spills. We also show applications to several real life oil spill scenarios using a series of L-band ALOS PALSAR images and X-band TerraSAR-X images acquired during the Deep Water Horizon spill in the Gulf of Mexico in 2010.

Mycoremediation: Potential of Fungi to Clean Arctic Soils

Christin Anderson

School of Natural Resources

University of Alaska Fairbanks

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Pleurotus ostreatus, commonly known as the oyster mushroom, has previously been shown to biodegrade petroleum using extracellular enzymes. However, few studies have tested petroleum biodegradation by fungi, known as mycoremediation, in cold temperatures. I incubated diesel-contaminated soil collected from interior Alaska with a cultivated strain of *P. ostreatus* var. *columbinus* at 4 °C, 10 °C, and 25 °C. In soil that was uninoculated and inoculated with *P. columbinus*, diesel range organics (DRO) decreased by 22-28% ($p=0.455$), 41-55% ($p=0.236$), and 91-92% ($p=0.735$) at the three temperatures, respectively. The differences in DRO loss between uninoculated and inoculated mesocosms at each temperature were not statistically significant, most likely due to very patchy distribution of diesel in the soil. However, DRO loss was significantly different between the temperatures evaluated. These results indicate that temperature is a more important factor controlling DRO loss than inoculation with *P. columbinus*. Inoculation may enhance DRO loss at medium temperatures, but not at the highest and lowest temperatures in this study. The results also suggest that inoculation might not be needed at sites where temperature can be increased.

BOEM Review of Proposed Liberty Development and Production Plan

Lauren Boldrick

Alaska Outer Continental Shelf Region

Bureau of Ocean Energy Management

U.S. Department of the Interior

In accordance with 30 CFR 550.267, the Bureau of Ocean Energy Management (BOEM) must complete a compliance review of all Development and Production Plans (DPPs) once the plan is deemed submitted in accordance with 30 CFR 550.231. The compliance criteria are listed in 30 CFR 550.202.

BOEM received Hilcorp Alaska LLC's (Hilcorp) Liberty DPP on September 8, 2015, and it was deemed submitted on September 17, 2015. This compliance review allows BOEM to incorporate comments from the public, the Governor of Alaska, and affected local governments into their assessment process. BOEM will evaluate the environmental impacts of the Liberty DPP as required by 30 CFR 550.269 to support this compliance assessment, and the Regional Supervisor will make a decision within 60 calendar days after the final Environmental Impact Statement (EIS) is adopted. The regional supervisor will (1) approve the DPP, (2) require modification of the proposed DPP, or (3) disapprove the DPP.

This poster presents a general overview of Hilcorp's proposal with a focus on their proposed pipeline and drilling program; specifically, pipeline design features to mitigate identified potential hazards and Hilcorp's well control plan. In keeping with an integrated approach to Arctic Management, BOEM recognizes that many Federal, State and local organizations will be involved in the review of the Liberty DPP, specifically in the drafting of the Liberty EIS, which will analyze impacts of a potential spill in the Liberty project area.

BOEM will also invite several Federal agencies and the State of Alaska to become cooperating agencies during this process to encourage wider adoption of the Liberty EIS for permitting actions related to the Liberty DPP. BOEM also uses this poster to notify the public of the on-going comment period for the Notice to Prepare an EIS, which ends on March 28, 2016.

BOEM's sister agency, the Bureau of Safety and Environmental Enforcement (BSEE) will next adopt the Liberty EIS for its permitting actions related to the design, fabrication and installation of the proposed gravel island and pipeline, and for its reviews of the Applications for Permit to Drill for each well initiated from the island.

BOEM Review of Proposed Liberty Development and Production Plan

Lauren Boldrick

Alaska Outer Continental Shelf Region

Bureau of Ocean Energy Management

U.S. Department of the Interior

Email: lauren.boldrick@boem.gov

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Tundra Treatment Guidelines—A Manual for Treating Oil and Hazardous Substance Spill to Tundra

Tim Cater

Senior Scientist

ABR, Inc.—Environmental Research & Services

Email: tcater@abrinc.com

Presenter Biography

Tim Cater has a background in plant ecology and has conducted extensive research on ecological restoration and land rehabilitation in tundra and taiga ecosystems, especially those resulting from anthropogenic disturbances. In particular, Tim is interested in developing new techniques to rehabilitate sites affected by spills of crude oil and other contaminants. Since earning his master's degree (Botany) from the Institute of Arctic Biology at UAF in 1990, Tim has been employed at ABR, Inc.—Environmental Research & Services, a company that is best known for promoting rigorous and objective science within the context of a triple bottom line business philosophy: economic viability, environmental stewardship, and social responsibility. ABR currently has a team of over 60 scientists and support staff in offices in Alaska and Oregon that provide science-based consulting services to a diverse array of private and public sector clients.

Abstract

The Tundra Treatment Guidelines (TTG) is published by the State of Alaska Department of Environmental Conservation (ADEC) Division of Spill Prevention and Response. This manual provides a menu of 37 tactics for spills of crude oil, diesel fuel, gasoline, saline waters and substances, drilling muds and fluids, and synthetic fluids after initial response efforts have eliminated the threat of large-scale spill migration. The tactics are labelled according to their purpose: Planning, Contaminant Recovery, Tundra Rehabilitation, or Assessment & Monitoring. The manual describes each tactic and specific limitations to consider when selecting a tactic. The equipment, materials, and personnel needed to implement each tactic are included, as well as a bibliography of more than 230 references that were used to determine the effectiveness of these tactics. TTG is a living document that is periodically updated and revised, and that may be copied, in any format, for all uses excluding those for profit. The manual is available on-line at: http://www.dec.alaska.gov/spar/ppr/r_d/ttman.

Physiological Effects of Oil, Dispersed Oil and Dispersants on a Sentinel Cold Water Species, the Bay Mussel

Dr. Katrina Counihan

Scientist

Alaska Sealife Center

Email: katrinac@alaskasealife.org

Oil and gas drilling have been occurring in Alaska since the 1950s, and offshore drilling is expected to increase as regions in the Arctic become ice-free. As petroleum development increases so does the risk of another oil spill. Oil spills can have a devastating effect on the marine environment and chemical dispersants are supposed to mitigate that effect. However, the majority of toxicity testing with dispersed oil or dispersants alone has primarily been conducted at temperate conditions, with species that do not inhabit Arctic and subarctic regions, or with dispersants that are not approved for use in Alaska. Therefore, the project with the following objectives is being conducted: 1. Conduct spiked exposure tests with bay mussels in seawater with oil, Corexit 9500 or oil dispersed with different concentrations of Corexit 9500; 2. Assess various physiological responses of bay mussels to the oil, dispersant and dispersed oil in the spiked exposure tests at different time points; 3. Determine the polycyclic aromatic hydrocarbon content of the oil and dispersed oil treatments used in the mussel exposures. The goal of this project is to develop a monitoring tool to assess recovery of coastal ecosystems using bay mussels in the event of an oil spill. Bay mussels are ideal for monitoring programs because they are ubiquitous, sessile organisms that bioaccumulate pollutants through filter-feeding. They would also be easily sampled for cost-effective monitoring programs in the case of an oil spill. Physiological responses will be assessed using biomarkers, which are measurable biological processes that indicate exposure to environmental stressors. Contaminants, such as oil and dispersants, have multiple effects on organisms, so various biomarker assays will be used to assess the impact on bay mussels.

Oil in Ice—Mechanical Response Options

Vince Mitchell

Vice President of Special Projects

Lamor Corporation AB

Email: vince.mitcheel@lamor.com

Presenter Biography

Vince has a wide range and substantial operational and technical oil spill expertise spanning twenty seven 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

Unprecedented seasonal retreat of sea ice in the Arctic is occurring. This will drastically increase the amount of worldwide marine activity in the arctic including an increase in shipping of all types of vessels, 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 and non-persistent oils.

There have been improvements over the past years for spill response in Arctic Waters in many areas including:

- In Situ Burning
- Mechanical containment recovery
- Dispersant operations
- Herding agents
- Predictions and modeling
- Remote monitoring/sensing

Due to potential permitting requirements and logistics requirements of some non-mechanical response options, containment and mechanical recovery will continue to be a primary response option.

This poster paper will look at developments in and the best available technology for mechanical recovery of oil in ice.

Air Quality Impacts of Herding Agent-Mediated In-Situ Burning for Arctic Oil Spills

Patrik Sartz and Srijan Aggarwal

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College of Engineering & Mines

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If a crude oil spill was to occur in partially ice-covered waters, many of the response tactics typically utilized in either open water or completely ice-covered conditions become inefficient. In such situations, in-situ burning (ISB) can prove to be an efficient response tool and herding agent application is one approach available to thicken the oil slick. This study assessed the impacts on air quality following ISB tests on crude oil, in combination with herding agents, in ice-infested waters. The research focused on measuring in-plume concentrations of atmospheric particulate matter sizes (PM₁, PM_{2.5}, & PM₁₀) and seven different combustion gases (CO, CO₂, NO, NO₂, NO_x, SO₂, & VOCs), with instruments placed 6-12 m away from the source area, during the ISB events, and also investigated if the utilized herding agent was detectable in the air borne plume. Preliminary findings include: 1) No chemical herder was detected in the collected samples analyzed using GC/MS; 2) In-plume concentrations of particulate matter and SO₂ were found to significantly exceed ($P < 0.01$) exposure limits determined by the Occupational Safety and Health Administration and the National Institute for Occupational Safety and Health, while the remaining compounds measured were significantly below ($P < 0.01$) established exposure limits. Future research will include refining methods for detection of any volatilized herding agent during ISB burns, as well as determining scalability of combustion gas emissions and particulate matter concentrations by conducting crude oil and herding agent in-situ burns at a laboratory (50-500 mL of crude oil & 1-10 mL of herding agent) scale, and potentially at a meso (1-4L of crude oil & 50-100ml of herding agent) scale.

Methods to Study Effects of Oil and Dispersed Oil on *Mysticete* Whale Baleen

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The objectives were to quantitatively assess drag in baleen (control) and to study the potential change in drag when North Slope crude oil and Corexit 9500A dispersant are introduced. To secure baleen for movement through water in the OHMSETT tank, a lever arm was fabricated at WHOI consisting of a baleen clamp, load cell, and pivot. The baleen clamp was mounted on a turntable that allowed baleen to be rotated. Two Omega load cells were used (100 and 500 lbs), and bridge speed data were recorded. Baleen from bowhead, right, and humpback whales (N=7) ranged from 0.5 to 2.7 meters in length and from 9 to 56 plates. Baleen was positioned at 54 and 90 ° orientations, and each baleen sample was run through water from 0.2 to 1.6 knots at 0.2 knot increments for a total of 127 runs. For oil treatment, we submerged baleen with a crane, applied fresh oil to the surface of the water within a containing hoop, and baleen was lifted through the oil. For dispersed oil treatment, Corexit 9500A was premixed with oil and dispersed through a series of underwater nozzles. We used a Laser In-Situ Scattering and Transmissometry (LISST) instrument to determine particle size distribution in a liquid fluid matrix on a volume concentration basis.

Oil Spill Response: Mitigation Measures to Minimize Impacts to Marine Mammals

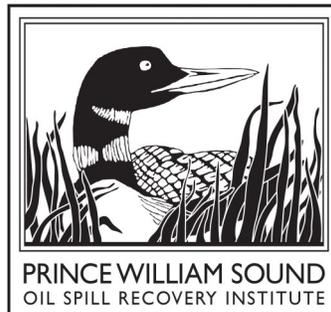
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The National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (FWS) work with the U.S. Coast Guard (USCG) and other trustee agencies and stakeholders to plan and prepare for oil spill response. In Alaska, marine mammals are present along most of the state's 44,000 miles of coastline and offshore throughout the 200 nm Exclusive Economic Zone. In training and during real response incidents in or around Alaska's marine waters, NMFS and FWS provide the USCG with mitigation measures that, when implemented, will reduce impacts of the response on marine mammals. Mitigation measures that have been implemented recently in Alaska include no-entry zones for response vessels near Steller sea lion haulouts and rookeries, no-approach zones around whales, and reporting requirements. Additional mitigation measures that could be applied in larger spill scenarios include protected species observer requirements, speed limits/restrictions, rehabilitation of oiled or injured marine mammals, restrictions of in-situ burns upwind of marine mammal concentrations, deterrence, and distance restrictions. In addition, marine mammals and their habitat and prey will be considered in net environmental benefit analyses when determining whether to use various spill response tactics (e.g., dispersants, in-situ burns, and others).

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The Prince William Sound (PWS) Oil Spill Recovery Institute (OSRI) was authorized in 1990 by the United States Congress to “identify and develop the best available techniques, equipment, and materials for dealing with oil spills in the Arctic and sub-Arctic marine environments” (Title V, Section 5001, Oil Pollution Act of 1990); and, also to “determine, document, assess and understand the long range effects of the EXXON VALDEZ oil spill on the natural resources of Prince William Sound. . . and the environment, the economy and the lifestyle and wellbeing of the people who are dependent on them.” In 1996, the act was amended to expand the area of emphasis from the Exxon Valdez oil spill region to the Arctic and sub-Arctic marine environments. A 2005 amendment mandates that OSRI continue its programs until one year after the completion of oil exploration and development efforts in Alaska.



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