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"The oil sands region in Western Canada is one of the world's largest proven oil reserves. To facilitate pipeline transport, highly viscous oil sands bitumen is blended with lighter hydrocarbon fractions to produce diluted bitumen (dilbit). With anticipated increases in bitumen production and transport dilbit, the risk of a dilbit spill is expected to rise. To understand the behaviour of dilbit in shallow groundwater systems in the event of a spill, we ran side-by-side dilbit and conventional heavy crude exposures, along with an untreated control, using soil-filled mesocosms. Soil cores were taken from the three mesocosm treatments at set intervals during a 104-day exposure. Phospholipid fatty acids (PLFAs), biomarkers for the active microbial population, were extracted from the soil. The stable carbon isotope ($\delta^{13}C$) contents of individual PLFAs and the radiocarbon contents ($\delta^{14}C$) of bulk PLFAs were then characterized. The $\delta^{14}C$ of bulk PLFAs ranged from -221.10 to -54.70 and -259.40 to -107.10 in dilbit- and conventional heavy crude-affected samples, respectively, indicating similar levels of microbial uptake of both oils compared to control soils ($\delta^{14}C$ -PLFA values > -46.10). 16S ribosomal RNA genes were also extracted from the mesocosm soil cores. Amplicon sequencing revealed that the microbial communities changed over time and these changes were different between treatment types. The relative abundance of *Polaromonas*, a known hydrocarbon-degrading bacterial genus, was significantly increased following exposure to both dilbit- and conventional crude-contaminated soil. This study demonstrates that the biodegradability of dilbit by the native microbial community following a spill in the shallow subsurface is similar to that of conventional heavy crude oil"--

"Asphalt: A History" provides a narrative history of asphalt and its effects from ancient times to the modern day. Although asphalt creates our environment, it also threatens it"--

Anyone But You - An underground pipeline has ruptured, spilling oily sludge into Minnesota's pristine Lake Bunyan. Taking the media's heat for Nations Oil is Corporate Communications Director Cathryn Mack, an old pro when it comes to spinning the facts in her company's favor. Stuck in Duluth to handle the press during eight weeks of cleanup, she finds a silver lining when Stacie Pilardi pops up on SappHere, a mobile app that seeks out nearby lesbians. Stacie is smart, funny, sexy as hell, and wants a long-term relationship as much as Cathryn—which is to say, not at all.

Abstract : With increased demand for oil, there is an increased risk for oil spills in many environments. A number of pipelines transport oil near or across freshwater systems including the Great Lakes. Microbes are capable of breaking down oil and have thus been proposed as tools for oil spill response through bioremediation. There is a need to understand the microbial response to diverse oil types in freshwater environments due to the lack of research into this topic. This study's main objectives are to understand how the freshwater microbial communities respond to oil, and how the bacterial communities may respond to different oil types. The bacterial community response to oil was examined at seven different geographical locations in the Great Lakes.

Additionally, the microbial community response to two very different oil types. A heavy oil, Cold Lake Diluted Bitumen (DilBit), and a light oil (Bakken) were examined. Our results demonstrated a distinct community composition at different sites throughout the Great Lakes. Furthermore, there was a distinct response to oil depending on the location. Additionally, our results showed a distinct community response to the two oil types tested Bakken and DilBit crudes. The primary organisms that responded to oil in our microcosms in the Great Lakes were bacteria from the families; Sphingomonadaceae, Rhodocyclaceae, Burkholderiales, and Comamonadaceae. Our results also indicated that the extent of response to oil varied greatly between offshore, the Straits, and inland systems. These findings suggest that in the case of an oil spill in the Great Lakes, the location of the spill and type of oil should be taken into account in planning bioremediation efforts. Our results demonstrate that in most locations in the Great Lakes, a common group of bacteria can be expected to respond to the oil exposure indicating the potential for oil biodegradation throughout the Great Lakes.

Introduction to Environmental Forensics

The Science and Technology of Unconventional Oils
Environmental Implications of Digital Technologies

Fingerprinting and Source Identification

June 12-14, 1991, Hotel Georgia, Vancouver, B.C.

His ideology-fuelled attack on Canadian society and values, and how we can resist and create the country we want
The Kalamazoo River Spill

Bitumen from the Alberta oil sands must be diluted to form diluted bitumen (dilbit) to facilitate transport through pipelines, yet little is known about its effects on aquatic organisms after a spill. Environmental weathering processes such as evaporation and sediment interaction manipulate spilled dilbit, which could affect its fate and toxicity in the environment. However, most studies to date that have characterized effects of dilbit to aquatic organisms have not incorporated weathering. In the present study, zebrafish (*Danio rerio*) embryos and adult freshwater amphipods (*Hyalella azteca*) were exposed to weathered sediment-bound dilbit. Sediment-bound dilbit exacerbated adverse effects associated with dilbit exposure due to oil-mineral aggregates directly interacting with amphipods and zebrafish embryos during exposure. As oil sands production expands, it is important to incorporate weathering processes when testing the toxicity of dilbit to aquatic organisms because sediment-bound dilbit can severely affect the health of freshwater fish and invertebrates.

InsideClimate News won the 2013 Pulitzer Prize in national reporting for this four-part narrative and six follow-up reports into an oil spill most Americans have never heard of. More than 1 million gallons of oil spilled into the Kalamazoo River in July 2010, triggering the most expensive cleanup in U.S. history -- more than 3/4 of a billion dollars -- and after almost two years the cleanup still isn't finished. Why not? Because the underground pipeline that ruptured was carrying diluted bitumen, or dilbit, the dirtiest, stickiest oil used today. It's the same kind of oil that the controversial Keystone XL pipeline could someday carry across the nation's largest drinking water aquifer. Written as a narrative, this page-turner takes an inside look at what happened to two families, a community, unprepared agencies and an inept company during an environmental disaster involving a new kind of oil few people know much about. Heavy oils, extra-heavy oils and tar sands are major players for the future of energy. They represent a massive world resource, at least the size of conventional oils. They are found all over the world but Canada and Venezuela together account, by themselves, for more than half of world deposits. They share the same origin as the lighter conventional oils, but their geological fate drove them into thick, viscous tar-like crude oils. Most of them result from alteration processes mediated by microbial degradation. They are characterized by a low content of lighter cuts and a high content of impurities such as sulfur and nitrogen compounds and metals ; so, their production is difficult and deployment of specific processes is required in order to enhance their transportability and to upgrade them into valuable products meeting market needs, and honouring environmental requirements. Although these resources are increasingly becoming commercially producible, less than 1% of total heavy crude oil deposits worldwide are under active development. The voluntarily wide scope of this volume encompasses geology, production, transportation, upgrading, economics and environmental issues of heavy oils. It does not pretend to be exhaustive, but to provide an authoritative view of this very important energy resource.

In this highly controversial and original work, Damien Short systematically rethinks how genocide is and should be defined. Rather than focusing solely on a narrow conception of genocide as direct mass-killing, through close empirical analysis of a number of under-discussed case studies – including Palestine, Sri Lanka, Australia and Alberta, Canada – the book reveals the key role played by settler colonialism, capitalism, finite resources and the ecological crisis in driving genocidal social death on a global scale.

Oil Shale and Tar Sands Resource Management Plan
Amendments to Address Land Use Allocations in
Colorado, Utah, and Wyoming

Finite Media

The Biological Effects of Diluted Bitumen (dilbit) on
Two Species of Pacific Salmonid

The Rise of the Wiindigoo Slayers

Examining Scientific and Environmental Issues : Hearing
Before the Subcommittee on Environment Joint with the
Subcommittee on Energy, Committee on Science, Space,
and Technology, House of Representatives, One
Hundred Thirteenth Congress, First Session, Tuesday,

May 7, 2013

Proceedings, Fourteenth Arctic and Marine Oilspill
Program Technical Seminar
Based on the author's decades of years of experience in oil refining, Catalytic Naphtha Reforming Process conveys essential information on key concepts, operations, and practices of catalytic naphtha reforming technologies and associated oil refining processes. The book reviews collective technical and operational advancements with respect to efficient use of catalysts and catalytic reformers in oil refining and incorporates key advancements from recent developments in catalytic reforming technologies and processes. High octane reformate gasoline blendstock production via the use of high performing continuous catalyst regenerative processes is emphasized for regulated, environmentally friendly gasoline. The benefits of timely, effective process unit monitoring are covered in this book. Some of the principal objectives of this book include the need to emphasize more proactive approaches in the planning, operations and maintenance of catalytic reforming units and oil refineries. A number of recommendations are provided for enhancing the operations, reliability, and productivity of catalytic reformers and oil refineries.

Proceedings of the seminar, covering the behaviour and fate of oil; assessment; activity reports from Washington State, Germany, Alaska, British Columbia and Michigan; remote sensing; countermeasures; in situ burning; bioremediation; biological effects; and shoreline cleanup. Orcas are one of earth's most intelligent animals. Benign and gentle, with their own languages and cultures, orcas' amazing capacity for long-term memory and, arguably, compassion, makes the ugly story of the captive-orca industry especially damning. In *Of Orcas and Men*, a marvelously compelling mix of cultural history, environmental reporting, and scientific research, David Neiwert explores how this extraordinary species has come to capture our imaginations—and the catastrophic environmental consequences of that appeal. In the tradition of Barry Lopez's classic *Of Wolves and Men*, David Neiwert's book is a powerful tribute to one of the animal kingdom's most remarkable members.

As conventional oil reserves deplete and more efficient refining technologies emerge, the use and transportation of heavy fuel oils such as dilbit is rising. Despite the risk of accidental dilbit spills, the fate and behaviour in aquatic systems is largely unknown. The objective of this thesis was to develop new approaches and insights to directly address knowledge gaps surrounding the fate and behaviour of diluted bitumen (dilbit) in freshwater systems. During the summers of 2017 and 2018, a large-scale collaborative field study was conducted at the International Institute for Sustainable Development's - Experimental Lakes Area (IISD-ELA), a world-renowned freshwater research station located in Northwestern Ontario, Canada. First, two tank-based dilbit spill simulations were carried out at oil:water ratios of 1:8000 and 1:800 v/v (Chapter 2). Here I examined the physical fate and behaviour of dilbit spilled onto the water's surface for 11 days. In this chapter I provide, for the first time, experimental evidence of dilbit physically sinking after 8 days of environmental weathering in land-based tanks containing natural lake water. Building on the findings of chapter 2, the remaining four chapters focus on a series of 70-d long experimental dilbit spills carried out in limnocorrals (10 m diameter x 1.5 m depth) installed directly in a freshwater lake. Chapter 3 provides, to our knowledge, the most detailed temporal account to date of dilbit submergence in freshwater at multiple oil:water ratios. In Chapter 4 I provide the rates at which over 100 individual hydrocarbons are depleted over time from the dilbit slicks and apply diagnostic ratios to postulate which weathering processes are responsible for the observed depletions. As predicted, evaporation, dissolution, and photooxidation are prominent weathering processes whereas biodegradation is not. I then describe both the short- and long-term behaviour of these compounds as they partition from the dilbit slick to the air, water, and sediments of the limnocorrals in Chapter 5. While the concentrations of polycyclic aromatic hydrocarbons (PAHs) were elevated in the water columns of each treatment, they were orders of magnitude lower than concentrations that pose a toxicological risk. The

same was true for all sediment samples except those that were in direct contact with sunken dilbit. This suggests that the major threat of dilbit spills from an ecotoxicological point of view is the dilbit-laden sediments produced by submergence. Finally, I demonstrated the successful application of a mass transfer model to predict the dissolution trends of the highly toxic benzene, toluene, ethylbenzene, and o,m,p-xylene (BTEX) compounds following the dilbit spills. In Chapter 7 I detail the implications and conclusions for each chapter and the thesis as a whole. I also describe areas where future research is needed. In the end, the conclusions of this thesis were: 1) dilbit has the propensity to sink following spills in freshwater, 2) prominent weathering processes include evaporation, dissolution, and photooxidation, 3) our regression design allowed for important relationships between contamination and spill size to be realized, 4) sunken dilbit poses a toxicological threat to aquatic biota, and 5) mass transfer models can accurately predict BTEX dynamics in the water column following a dilbit spill.

MICROBIAL COMMUNITY RESPONSE TO LIGHT AND HEAVY CRUDE OIL IN FRESHWATER SYSTEMS

The Patch

Bioaccumulation and Toxicokinetics of Polycyclic Aromatic Compounds and Metals in Giant Floater Mussels (*Pyganodon Grandis*) Exposed to a Simulated Diluted Bitumen Spill

Heavy Crude Oils

To Be A Water Protector

Essential Skills for 21st Century Journalism

My Healing Cycle Across America

Diluted bitumen has been transported by pipeline in the United States for more than 40 years, with the amount increasing recently as a result of improved extraction technologies and resulting increases in production and exportation of Canadian diluted bitumen. The increased importation of Canadian diluted bitumen to the United States has strained the existing pipeline capacity and contributed to the expansion of pipeline mileage over the past 5 years. Although rising North American crude oil production has resulted in greater transport of crude oil by rail or tanker, oil pipelines continue to deliver the vast majority of crude oil supplies to U.S. refineries. Spills of Diluted Bitumen from Pipelines examines the current state of knowledge and identifies the relevant properties and characteristics of the transport, fate, and effects of diluted bitumen and commonly transported crude oils when spilled in the environment. This report assesses whether the differences between properties of diluted bitumen and those of other commonly transported crude oils warrant modifications to the regulations governing spill response plans and cleanup. Given the nature of pipeline operations, response planning, and the oil industry, the recommendations outlined in this study are broadly applicable to other modes of transportation as well.

Papers presented at the 14th Arctic Marine Oil Spill Technical Seminar, June 12-14, 1991, Vancouver, British Columbia, including behaviour and fate of oil, biological degradation and effects, activity reports and preparedness, computer systems, the legal and social context, risk analysis, in-situ burning, spill countermeasures, remote sensing and mapping, shoreline cleanup and recent spill incidents.

Over the past five hundred years, North Americans have increasingly turned to mining to produce many of their basic social and cultural objects. From cell phones to cars and roadways, metal pots to wall tile and even talcum powder, mineral-intensive products have become central to modern North American life. As this process has unfolded, mining has also indelibly shaped the natural world and North Americans' relationship with it. Mountains have been honeycombed, rivers poisoned, and forests leveled. The effects of these environmental transformations have fallen unevenly across North American societies. Mining North America examines these developments. Drawing on the work of scholars from Mexico, the United States, and Canada, this book explores how mining has shaped North America over the last half millennium. It covers an array of minerals and geographies while seeking to draw mining into the core debates that animate North American

environmental history generally. Taken together, the authors' contributions make a powerful case for the centrality of mining in forging North American environments and societies.

Canadian bitumen is mainly transported in a diluted form via pipeline and train, all posing a risk as they can lead to the release of diluted bitumen (dilbit) in the environment. In the summer of 2018, a collaborative large-scale field experiment was conducted at the International Institute for Sustainable Development - Experimental Lakes Area (IISD-ELA), a world-renowned aquatic research facility. The research objectives of the Boreal lake Oil Release Experiment by Additions to Limnocorrals (BOREAL) project were to understand the fate, behaviour, and potential toxic effects of dilbit in a freshwater Boreal lake to inform evidence-based management strategies for the transport of dilbit. A range of controlled dilbit spills was performed in seven 10 m diameter limnocorrals (~100,000 L of water) resulting in environmentally realistic dilbit:water dilutions ranging from 1:69,200 to 1:504, representing the upper half of the distribution of oil spill sizes in North America in the last decade. Additionally, two limnocorrals not treated with dilbit were studied as controls. This thesis identifies the bioaccumulating compounds derived from naturally weathered dilbit in adult giant floater mussels (*Pyganodon grandis*), to determine the rates at which they were accumulated and excreted. More specifically, the bioaccumulation potential and toxicokinetic parameters of polycyclic aromatic compounds (PACs) and various metals were assessed in mussels exposed *ex situ* for 41 days (25 days of exposure and 16 days of depuration) to water from the limnocorrals. These compounds have shown to be toxic, carcinogenic, and mutagenic to aquatic organisms. Mussels exposed to dilbit-contaminated water experienced significantly greater TPACs concentrations (0.40 - 0.90 $\mu\text{g L}^{-1}$, n=12) compared to mussels from the Control (0.017 $\mu\text{g L}^{-1}$, n=4). Furthermore, dilbit-contaminated water had a higher proportion of alkylated PACs compared to their parent counterpart, demonstrating petrogenic PAC profiles. We detected significantly greater TPACs concentrations in mussels exposed to dilbit-contaminated water (25.92 - 27.79 $\mu\text{g g}^{-1}$, ww Lipid, n=9, at day 25 of the uptake phase) compared to mussels from the Control (average of 2.62 \pm 1.95 $\mu\text{g g}^{-1}$, ww Lipid; \pm SD, n=17). Alkylated PACs represented 96.4 \pm 1.8%, \pm SD, n=12 of TPACs in mussels from dilbit-contaminated treatments at day 25 of the uptake phase, indicating the importance of conducting a more inclusive assessment of petrochemical mixtures as most studies only focus on parent PACs. From first-order one-compartment models derived from nonlinear curve fitting of the accumulation phase or sequential modelling method, uptake (0.66 - 24.65 L g⁻¹ day⁻¹, n=87) and depuration (0.012 - 0.37 day⁻¹, n=87) kinetic rate constants, as well as bioconcentration factors (log values from 3.85 - 6.12 L kg⁻¹, n=87) for the 29 PACs that bioaccumulated in mussels suggested that alkylated PACs have greater bioaccumulation potential compared to their parent PAC counterpart. Results from this study also demonstrated that giant floater mussels could be used to biomonitor PAC contamination following oil spills as PACs accumulated in mussel tissue and were still present following the 16 day depuration phase. The results of this study are the largest, most comprehensive set of toxicokinetic and bioaccumulation information of PACs (44 analytes) in freshwater mussels obtained to date. Metal contamination following the controlled dilbit spill was minimal, but mussels exposed to water contaminated with naturally weathered dilbit experienced elevated concentrations of dissolved zinc (30.26 - 38.26 $\mu\text{g L}^{-1}$, n=12) compared to the mussels in the uncontaminated water (6.75 \pm 3.31 $\mu\text{g L}^{-1}$, n=4), surpassing the Canadian water quality guidelines for the protection of aquatic life. However, it is not clear if dilbit contamination caused elevated zinc concentrations in the water as other factors, such as limnocorral building

materials and/or galvanized minnow traps used in the limnocorrals, could have contributed to zinc contamination. Nonetheless, giant floater mussels did not accumulate zinc in their tissues.

Redefining Genocide

Of Orcas and Men

Proceedings of the ... Annual Arctic Marine Oilspill Program Technical Seminar

Asphalt

An Environmental History Since 1522

Hearing Before the Subcommittee on Railroads, Pipelines, and Hazardous Materials of the Committee on Transportation and Infrastructure, House of Representatives, One Hundred Thirteenth Congress, Second Session, May 20, 2014

A Comparative Study of Environmental Fate, Effects, and Response

The major petroleum product derived from the Canadian Alberta oil sands is bitumen, which is commonly mixed with diluents to produce several blends of diluted bitumen (dilbit). The prospected expansions of dilbit transportation capacity in coastal regions of British Columbia (BC) increase the risks of accidental releases of dilbit into freshwater and marine environments of particular concern are the potential risks of exposure to sensitive Pacific salmonids. The central goal of this research was to generate new empirical data to characterize the toxicity of the water-soluble fraction (WSF) of unweathered Cold Lake Blend dilbit to two Pacific salmon species: sockeye (*Oncorhynchus nerka*) and pink salmon (*Oncorhynchus gorbuscha*). A comprehensive suite of studies examined the acute and chronic toxic outcomes including lethality, effects on growth, swimming performance, exercise recovery capacity, body energetics, the interrenal stress response, iono-osmoregulatory ability, immune function, and genetic responses. Exposure of sockeye from the fertilized embryos to swim up stage resulted in increased mortality, impaired growth, as well as reductions in both critical (Ucrit) and burst swimming speed (Uburst) in free-swimming fry. These effects correlated with alterations in energy substrate reserves at all stage and an interference in the utilization of lipid energy sources and the ability to mount a physiological stress response. Exposure of juvenile salmonids to the WSF of dilbit (at TPAC concentrations at the ppb level) resulted in sublethal effects that included a classic physiological stress response, and alterations in iono-osmoregulatory homeostasis and immunological performance. Reductions in swimming performance were correlated with a significantly diminished aerobic scope following exposure and recovery following burst exercise was altered. In experiments with juvenile pinks, a 3 month exposure at varying salinity and temperature showed that higher temperatures and salinities affected dilbit-induced mortality, growth, osmoregulation, and energy storage. In a larger context, the findings here provide necessary toxicological information required for the development of risk assessment plans for managing salmon populations and restoring habitat in the event of potential pipeline failures or tanker spill.

More than 1 million gallons of oil spilled into the Kalamazoo River in July 2010, triggering the most expensive cleanup in U.S. history -- more than 3/4 of a billion dollars -- and after almost two years the cleanup still isn't finished. Why not? Because the underground pipeline that ruptured was carrying diluted bitumen, or dilbit, the dirtiest, stickiest oil used today. It's the same kind of oil that the controversial Keystone XL pipeline could someday carry across the nation's largest drinking water aquifer. Written as a narrative, this page-turner takes an inside look at what happened to two families, a community, unprepared agencies and an inept company during an environmental disaster involving a new kind of oil few people know much about.

Oil Spill Environmental Forensics Case Studies includes 34 chapters that serve to present various aspects of environmental forensics in relation to "real-world oil spill case studies from around the globe. Authors representing academic, government, and private researcher groups from 14 countries bring a diverse and global perspective to this volume. Oil Spill Environmental Forensics Case Studies addresses releases of natural gas/methane, automotive gasoline and other petroleum fuels, lubricants, vegetable oils, paraffin waxes, bitumen, manufactured gas plant residues, urban runoff, and, of course, crude oil, the latter ranging from light Bakken shale oil to heavy Canadian oil sands oil. New challenges surrounding forensic investigations of stray gas in the shallow subsurface, volatiles in air, dissolved chemicals in water (including passive samplers), and biological tissues associated with oil spills are included, as are the effects and long-term oil weathering, long-term monitoring in urbanized and non-urbanized environments, fate and transport, forensic historical research, new analytical and chemical data processing and interpretation methods. Presents cases in each chapter on the application of specific oil spill environmental forensic techniques Features chapters written by international experts from both academia and industry Includes relevant concepts and theories elucidated for each theme

This book, *The Science and Technology of Unconventional Oils: Finding Refining Opportunities*, intends to report the collective physical and chemical knowledge of unconventional oils (heavy, extra-heavy, sour/acid, and shale oil) and the issues associated with their refining for the production of transportation fuels. It will focus on the discussion of the scientific results and technology activities of the refining of unconventional oils. The presence of reactive and refractory compounds and components that negatively impact refining processing (the "bad actors") are discussed and analyzed. The commercially available technologies, with their reported improvements and emerging ideas, concepts, and technologies, are described. This comprehensive overview constitutes the basis for establishing technology gaps, and in return sets the science and technology needs to be addressed in the future. In summary, this book incorporates the relevant knowledge of processing unconventional crude oils and of the "Bottom-of-the-Barrel" fraction, describing the related commercially available and emerging technologies to contribute to the identification of existing gaps. Relates physicochemical properties and phenomenological behavior of unconventional oils to refining challenges Describes commercially available technologies and the problems they solve Lists recent improvements in various processes and identifies technology gaps Explains emerging new refining technologies and the problems they solve

Discusses future needs and challenges, and suggests further research and development needs

Spills of Diluted Bitumen from Pipelines

A History

June 10-12, 1992, Westin Hotel, Edmonton, Alberta

Proceedings of the ... Arctic and Marine Oil Spill Program Technical Seminar

Outpedaling the Big C

Marine Oil Spills 2018

Toxicity of Weathered Sediment-bound Dilbit to Freshwater Fish and Invertebrates

The third edition of *Introduction to Environmental Forensics* is a state-of-the-art reference for the practicing environmental forensics consultant, regulator, student, academic, and scientist, with topics including compound-specific isotope analysis (CSIA), advanced multivariate statistical techniques, surrogate approaches for contaminant source identification and age dating, dendroecology, hydrofracking, releases from underground storage tanks and piping, and contaminant-transport modeling for forensic applications. Recognized international forensic scientists were selected to author chapters in their specific areas of expertise and case studies are included to illustrate the application of these methods in actual environmental forensic investigations. This edition provides updates on advances in various techniques and introduces several new topics. Provides a comprehensive review of all aspects of environmental forensics Coverage ranges from emerging statistical methods to state-of-the-art analytical techniques, such as gas chromatography-combustion-isotope ratio mass spectrometry and polytopic vector analysis Numerous examples and case studies are provided to illustrate the application of these forensic techniques in environmental investigations

Most Canadians know that Stephen Harper has had a tremendous impact on the country since becoming prime minister in 2006. But few have the in-depth knowledge of how far his transformation has gone -- what has already been done, and what the consequences will be in the future. This book brings together Canadian experts in a wide variety of areas. They document key changes put in place by the Harper government. There have been dramatic changes in education, health care, women's rights, science and research, guiding the economy, labour unions, water and natural resources, and aboriginal affairs. Most of these measures have been designed to be difficult, if not impossible, to reverse. Readers will for the first time grasp the breadth and depth of the Harper attack on institutions, policies, and programs that embody values and principles shared by most Canadians. Each chapter documents the dangers of a government fixated on the needs of corporations and the one percent, blinded to our environmentally unsustainable lifestyle, and expanding surveillance and security measures to intimidate and threaten opponents. The contributors to this book believe that engagement in public affairs by the citizenry can trump the power of the elites and the giant corporations who are the winners of the Harper era. As activists in public life, they propose strategies and measures to create a Canada that champions fairness, social justice, real democracy in our government institutions, action to reverse global warming, and a constructive role in world affairs.

Fossil fuels are a valuable commodity at the forefront of national and international politics. Pipelines can create jobs and economic growth, not to mention delivering a commodity to people who need it. What happens when there is conflict about the land through which a pipeline travels? Such conflicts can lead to protests, stoppages, and even war. Readers of this comprehensive volume, which explores the topic from a multitude of angles, will learn how a simple pipeline can have enormous geopolitical ramifications.

Winona LaDuke is a leader in cultural-based sustainable development strategies, renewable energy, sustainable food systems and Indigenous rights. Her new book, *To Be a Water Protector: Rise of the Wiindigoo Slayers*, is an expansive, provocative engagement with issues that have been central to her many years of activism. LaDuke honours Mother Earth and her teachings while detailing global, Indigenous-led opposition to the enslavement and exploitation of the land and water. She discusses several elements of a New Green Economy and outlines the lessons we can take from activists outside the US and Canada. In her unique way of storytelling, Winona LaDuke is inspiring, always a teacher and an utterly fearless activist, writer and speaker. Winona LaDuke is an Anishinaabekwe (Ojibwe) enrolled member of the Mississippi Band Anishinaabeg who lives and works on the White Earth Reservation in Northern Minnesota. She is executive director of Honor the Earth, a national Native advocacy and environmental organization. Her work at the White Earth Land Recovery Project spans thirty years of legal, policy and community development work, including the creation of one of the first tribal land trusts in the country. LaDuke has testified at the United Nations, US Congress and state hearings and is an expert witness on economics and the environment. She is the

author of numerous acclaimed articles and books.

A Review of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011

The Fate and Behaviour of Diluted Bitumen and Its Chemical Constituents In Freshwater Systems Following Simulated Spills Pipelines and Politics

Beautiful Lake

The Dilbit Disaster

Advanced Reporting

Sockeye (Oncorhynchus Nerka) and Pink Salmon

(Oncorhynchus Gorbuscha)

Starting in Astoria, Oregon, Pulitzer Prize-winner McGowan begins a wonderful journey where she realizes just how many communities have been affected by cancer and are willing to help her. Each time she stops along the way, she learns something about the different cities or about her family.

News gathering is a large, complicated and often messy task that has traditionally been viewed by journalists as irretrievably idiosyncratic, best learned through trial and error. *Advanced Reporting* takes the opposite approach, focusing on reporting as a process of triangulation based on three essential activities: analyzing documents, making observations and conducting interviews. In this readable book, veteran journalism professor Miles Maguire shows how the best reporters use these three tools in a way that allows them to cross-check and authenticate facts, to reduce or eliminate unsupported allegations and to take readers and viewers to a deeper level of insight and understanding. This book will help to prepare students for a profession marked by increasing complexity and competition. To succeed in this environment, journalists must learn to make the most of digital media to intensify the impact of their work. At the same time, reporters must contend with a host of sophisticated public relations techniques while engaging with news audiences that no longer just consume journalism, but also collaborate in its creation. Discussion questions and exercises help students put theory into practice.

Standard Handbook Oil Spill Environmental Forensics: Fingerprinting and Source Identification, Second Edition, provides users with the latest information on the tools and methods that have become popular over the past ten years. The book presents practitioners with the latest environmental forensics techniques and best practices for quickly identifying the sources of spills, how to form an effective response, and how to determine liability. This second edition represents a complete overhaul of the existing chapters, and includes 13 new chapters on methods and applications, such as emerging application of PAHi isomers in oil spill forensics, development and application of computerized oil spill identification (COSI), and fingerprinting of oil in biological and passive sampling devices. Contains 13 new chapters on methods and applications, including emerging application of PAH isomers in oil drill forensics, the development and application of computerized oil spill identification (COSI), and the fingerprinting of oil in biological and passive sampling devices Presents the latest technology and methods in biodegradation of oil hydrocarbons and its implications for source identification, surface trajectory modeling of marine oil spills, and identification of hydrocarbons in biological samples for source determination Contains new case studies to illustrate key applications, methods, and techniques

While digital media give us the ability to communicate with and know the world, their use comes at the expense of an immense ecological footprint and environmental degradation. In *Finite Media* Sean Cubitt offers a large-scale rethinking of theories of mediation by examining the environmental and human toll exacted by mining and the manufacture, use, and disposal of millions of phones, computers, and other devices. The way out is through an eco-political media aesthetics, in which people use media to shift their relationship to the environment and where public goods and spaces are available to all. Cubitt demonstrates this through case studies ranging from the 1906 film *The Story of the Kelly Gang* to an image of Saturn taken during NASA's Cassini-Huygens mission, suggesting that affective responses to images may generate a populist environmental politics that demands better ways of living and being. Only by reorienting our use of media, Cubitt contends, can we overcome the failures of political elites and the ravages of capital.

Inside the Biggest Oil Spill You've Never Heard of Anyone But You

From Geology to Upgrading : an Overview

Keystone XL Pipeline

What Killer Whales Can Teach Us

American Jobs Now

Pipelines, Politics, and Economies of Knowledge

Canada has become increasingly economically dependent on the exportation of bitumen to trans-oceanic international markets. As the export of Alberta bitumen from ports located in British Columbia increases, oil spill response and readiness measures become increasingly important. Although the frequency of ship-source oil spills has dramatically declined over the past several decades, they remain environmentally devastating when they occur. In the event of a marine spill, great lengths of shoreline are at risk of being contaminated. Once ashore, oil can persist for decades if shoreline hydraulic conditions are correct and remediation does not occur. Most commonly transported oils (e.g., fuel oils, Bunker C, crude oil, etc.) have been thoroughly studied, and their fate and behaviour in the event of a marine spill is well understood. In contrast, because diluted bitumen has been historically traded in relatively low quantities and has almost no spill history, there is a sizable knowledge gap regarding its effects and behaviour in both the marine environment and on coastal shorelines. The intent of this thesis was to develop a classification scheme to identify marine shorelines of high and low diluted bitumen (dilbit) retention for southeastern Vancouver Island, British Columbia. This study builds upon the outcome of former laboratory bench top dilbit and sediment research known as Bitumen Experiments (Bit_Ex). Bit_Ex investigated dilbit

penetration and retention in six engineered sediment classifications ranging from coarse sand to very large pebble in accordance with the Wentworth Classification scheme. This research used Bit_Ex findings to predict dilbit retention in poorly sorted in-situ beach sediments found on shorelines representative of the southern coast of Vancouver Island, British Columbia, Canada. Field and laboratory measurements were conducted to document the occurrence of in-situ shoreline sediments and hydraulic conditions and were used to predict dilbit retention by comparing such characteristics between Bit_Ex and unconsolidated in-situ beach sediments. Saturated hydraulic conductivity (Ks) was measured using a double-ring constant-head infiltrometer. Measured Ks values were then compared to predicted Ks values generated by five semi-empirical Ks equations. A modified version of the Hazen Approximation was selected as the most appropriate. Using measured and calculated metrics, sediments were grouped as having either low or high dilbit retention. When sediments were analysed as homogenous samples, the experimental results suggested two of ten shorelines were composed of a combination of low and high retention sections, while the remaining eight sites were of low retention. Upon the isolation of coarse surface strata, results indicated two shorelines were entirely veneered with high retention sediments, and four shorelines were a combination of high and low retention. The residual four shorelines were found to be entirely composed of low retention sediments. The results illuminate the importance of shoreline stratification when predicting shoreline oil retention. This characteristic is a factor that current shoreline oil retention mapping techniques do not adequately consider. Additionally, the findings suggest that while sediments indicative of retaining weathered dilbit are relatively uncommon within Juan de Fuca and Harro Straits, high retention unweathered dilbit sediments are more common.

Lake Ontario, an inland sea. Beset by conflicting demands, industrial legacies of pollution and energy production, and ever increasing human needs. A quest for hope.

The mitigation of oil spills is an important facet of environmental protection. Understanding oil spills is a first step toward preventing and minimizing their damage to the environment.

This compilation presents several of the current studies related to such an understanding of oil spills and the environment. This book is a compilation of 14 papers presenting new developments in the field of oil spills, giving insight into the rapidly changing world of oil spill studies and technology. The 14 papers included cover topics varying from risk analysis to oil spill remote sensing. Broadly categorized, included are six papers on modeling, four papers on remote sensing, three papers on risk assessment, and one paper on oil spill countermeasures. Each paper presents a unique insight into a facet of oil spill research and technology. The authors of these papers represent many different countries and affiliations around the world.

Bestselling author Chris Turner brings readers onto the streets of Fort McMurray, showing the many ways the oilsands impact our lives and demanding that we ask the question: In order to both fuel the world and to save it, what do we do about the Patch? In its heyday, the oilsands represented an industrial triumph and the culmination of a century of innovation, experiment, engineering, policy, and finance. Fort McMurray was a boomtown, the centre of a new gold rush, and the oilsands were reshaping the global energy, political, and financial landscapes. The future seemed limitless for the city and those who drew their wealth from the bitumen-rich wilderness. But in 2008, a new narrative for the oilsands emerged. As financial markets collapsed and the scientific reality of the Patch 's effect on the environment became clear, the region turned into a boogeyman and a lightning rod for the global movement combatting climate change. Suddenly, the streets of Fort McMurray were the front line of a high-stakes collision between two conflicting worldviews—one of industrial triumph and another of environmental stewardship—each backed by major players on the world stage. The Patch is the seminal account of this ongoing conflict, showing just how far the oilsands reaches into all of our lives. From Fort Mac to the Bakken shale country of North Dakota, from Houston to London, from Saudi Arabia to the shores of Brazil, the whole world is connected in this enterprise. And it requires us to ask the question: In order to both fuel the world and to save it, what do we do about the Patch?

Standard Handbook Oil Spill Environmental Forensics

The People, Pipelines, and Politics of the Oil Sands

The American Energy Initiative, Part 10:,...Serial No. 112-63,

*112-1 Hearing, **

Dilbit Disaster

Canada after Harper

Biodegradation of Diluted Bitumen in Shallow Groundwater Systems

Settler Colonialism, Social Death and Ecocide