

Making Waves 2015

Graduate Project Presentations of the Master of Marine Management Class of 2015



Monday November 23, 2015
9:00 am to 4:00 pm
Akins Room, NS Archives
6016 University Avenue
Halifax, NS

Making Waves 2015 Schedule



Time	Name	Title
9:00	Coffee/Tea	
9:15	Introductory Remarks – Claudio Aporta	
9:30	Wenhui Gao	Sediment Quality Analysis and Related Management Approaches in Halifax Harbour
9:52	Alexandra Chadid	Coastal Vulnerability for Ship-Source Oil Spill Preparedness and Response Planning in Halifax Harbour
10:14	Kimberly Vardon	Examining the Feasibility of Implementing Marine Mammal Oil Spill Response in Canada
10:34	Break	
10:55	Elizabeth Baker	Influential or ignored? The role of fishermen in management of the Nova Scotia lobster industry
11:17	Maryann Watson	Bycatch 22: Regulatory pressures of selective fishing on commercial salmon fishers and impacts of handling on chum salmon (<i>Onchorhynchus keta</i>) released from purse seine fisheries in Northern British Columbia
11:39	Kascia White	Applying Adaptive Management Approaches to Data Limited Fisheries: The Case of Bermuda's Shallow Water Snapper Species
12:00	Lunch	
12:45	Adrian Gerhartz Abraham	Systematic Marine Conservation Planning in the Scotia Shelf Bioregion
1:07	Elizabeth Edmondson	Advancing an Integrated Management approach to Ship Strikes with Baleen whales on Canada's Pacific Coast
1:29	Julie Hovey	Vessel needs, preferences, and restrictions related to minimizing risk to whales without compromising vessel operations and the safety of navigation
1:50	Break	
2:10	Helen McConnell	Shipping and Seismic Exploration Noise in the Arctic Marine Soundscape: A look at Mitigation Measures for Cetaceans
2:32	Erin Keenan	Mobilizing Inuit Qaujimajatuqangit in narwhal management through community empowerment: A case study in Nauyasat, Nunavut
2:54	Hillary M ^{ac} Donell	Examining community adaptation readiness to climate change in the Inuvialuit Settlement Region, Northwest Territories
3:16	Taylor Mason	A Role for Inuit: How northern communities can inform and influence the dynamics of offshore oil and gas development in Nunavut
3:40	Wrap up and Awards	

Each student is allotted 20 minutes for their presentation (13 minutes for presentation, 7 minutes for questions). There is a 2 minute break for change-over of presenter.

Making Waves 2015 Abstracts

(in alphabetical order)

Elizabeth Baker

Baker, E. 2015. Influential or ignored? The role of fishermen in management of the Nova Scotia lobster industry [graduate project]. Halifax, NS: Dalhousie University.

Abstract

The Atlantic Canadian lobster industry is the highest valued fishery in Canada, with Nova Scotia landings representing more than half of the total industry value. As catches have steadily risen over the past decade, the lobster fishery represents one of the most successful fisheries, past or present, within Atlantic Canada. The industry supports many coastal communities and plays an important role in the livelihoods of many families who participate in the harvesting, processing, transporting, or selling of lobster. While Fisheries and Oceans Canada (DFO) uses advisory committees as well as other forms of consultation with industry, there is no framework in place to advance participation, so that fishermen can become more engaged in making final management decisions. This results in inconsistencies in terms of the levels to which fishermen's concerns are addressed in management of the fishery. Using the study area of Eastern Nova Scotia, semi-structured interviews were conducted with fishermen from four lobster-fishing areas (LFAs) to provide insights into current participatory and decision-making practices. Barriers to fishermen participation in management were also identified by those interviewed. A literature review was completed to identify aspects of participatory management regimes that could be used within management and decision-making for the Atlantic lobster fishery. Observations were made regarding the success of the industry thus far stemming from participatory practices, as well as ways to enhance these practices to ensure the future viability of the fishery.

Keywords: lobster industry; participation; DFO; fishermen; fishermen's organization; decision-making; management; Atlantic; Nova Scotia.

Elizabeth completed her internship with the Fishermen and Scientists Research Society, a non-profit organization that promotes the long-term sustainability of marine fisheries resources through collaboration between fishermen and scientists. Elizabeth regularly accompanied fishermen on fishing trips to sample lobsters and additional marine species, resulting in scientific data that can be used to support management decisions. Elizabeth also helped to complete the V-notching conservation program on the Eastern Shore of Nova Scotia. Under the guidance of Chris Milley (Adjunct Professor, Marine Affairs and MMM alumni) and Claudio Aporta (Director, Marine Affairs), this work allowed Elizabeth to connect with fishermen throughout the province to discuss participatory management of the lobster industry, and methods for its improvement for her graduate project.

Alexandra Chadid

Chadid, A. 2015. Coastal Vulnerability for Ship-Source Oil Spill Preparedness and Response Planning in Halifax Harbour, Nova Scotia [graduate project]. Halifax, NS: Dalhousie University.

Abstract

Ship-source oil spills are amongst the major sources of oil affecting coastal areas. An end-to-end marine oil spill analysis may provide a model to better allocate response resources or prepare contingency plans for highly vulnerable zones. A consequence assessment, a key aspect of this type of analysis which considers economic, social and environmental aspects of a geographic area, is presented in this study as a GIS index tool, which can be applied in the context of Atlantic Canada. A theoretical framework and conceptual model is developed based on a literature review of oil spill state-of-the-art analysis using Exploratory Network Analysis; and tested on a realistic case study (Halifax Harbour, NS). The novel approach for reviewing the literature provided sound criteria for the conceptual model, which fits the end-to-end marine oil spill analysis, segregating elements regarding exposure and oil behaviour. Furthermore, oil spill management indicators were tailored using expertise from Atlantic Canada's oil spill responders, and many gaps were identified to potentially refine the model later. Finally, this model considers the range of aspects that influence the consequences of a ship-based oil spill, using readily available information and considering relevant stakeholder's interests.

Keywords: Oil Spill Risk Analysis, Vulnerability, Index, Hazard, GIS, Halifax Harbour

Alexandra participated as an intern in the Maritime Activity and Risk Investigation Network (MARIN) Research Group in the Industrial Engineering Department, Dalhousie University. Her work focused on vulnerabilities caused by ship-based oil spills in Atlantic Canada. She has participated in the project "Spatial Risk Analysis of Ship-based Spills to Assess Shoreline Vulnerability", a research supported by the Marine Environmental Observation, Prediction and Response Network Network Centre of Excellence (MEOPAR-NCE) under the supervision of her internship host, Dr. Ronald Pelot, and MARIN Research Associate Dr. Hilario Calderon. During the internship she gained technical skills in the use of different engineering and decision making technical tools (Geographic Information Systems (GISs), Multivariate Analysis, Exploratory Network Analysis (ENA) and Mercurial Version Control). Through her internship, she had the opportunity to participate in the NOTES Conference (NEIA's Oil Industry and the Environment Seminar) in St. John's, NL., gaining relevant insights for her research project. She presented her project research at the MEOPAR Annual Scientific Meeting (ASM) in Vancouver, BC and attended the MEOPAR scientific training workshop.

Elizabeth Edmondson

Edmondson, E. 2015. Advancing an Integrated Management approach to Ship Strikes with Baleen whales on Canada's Pacific Coast [graduate project]. Halifax, NS: Dalhousie University.

Abstract

Ship strikes have been identified as a threat to the survival and recovery of whale species populations. On Canada's Pacific coast, ship strikes are noted as a potential threat to the recovery of Baleen whales, specifically gray, blue, fin, sei, North Pacific right whale and humpback populations. Limited information on Baleen species abundance and habitat has led to gaps in knowledge concerning the extent to which ship strikes pose a threat to these species within Canada's Pacific waters. This has resulted in a lack of appropriate management measures that consider the mitigation of ship strike risk.

As development in marine transportation industries on Canada's Pacific coast progresses, management of industries along with conservation objectives for whale species should be mutually addressed. This paper will provide an integrated management approach to minimizing ship strike risk within the context of Canada's Pacific coast, taking into consideration the existing opportunities and constraints. A review of experiences from other jurisdictions provide guidance on how an operational framework could be developed. Introducing an integrated management approach to mitigating ship strike risk will balance progress in marine transportation industries with conservation responsibilities to whale species.

Although information is lacking to support a thorough understanding of the risk of ship strikes on the Pacific coast, developing an IM approach will support information gathering and foster a collaborative environment for stakeholders to discuss development in a precautionary manner that can adapt as needed.

Keywords: integrated management, Canada, Pacific Coast, ship strikes, stakeholder engagement, Baleen whales

Elizabeth completed her internship in Victoria, BC, through the Whale, Habitat and Listening Experiment (WHaLE) project being undertaken by Dr. Dave Duffus of the Whale Lab at the University of Victoria. Her work over the internship consisted mainly of research and data gathering for her project regarding the social and policy dimensions concerning marine mammal protection and conservation and marine transportation on the west coast. The recommendations from her project will be provided to the WHaLE project for the next steps on engaging with stakeholders on the west coast.

Wenhui Gao

Gao, W. 2015. Sediment Quality Analysis and Related Management Approaches in Halifax Harbour [graduate project]. Halifax, NS: Dalhousie University.

Abstract

Halifax Harbour is one of the world's deepest harbours. It is sheltered, spacious, and has minimal currents and tides. The ice free port leaves the harbour accessible year round, and it is the closest port of call for ships operating the North Atlantic, Round-the-World and Suez routes. These advantageous natural conditions have made Halifax Harbour one of the largest commercial ports in Canada and home of Canada's east coast Navy. In addition to being a major shipping port, industrial centre, naval centre and research centre, Halifax Harbour is surrounded by one of the fastest growing urban regions in Atlantic Canada. Increasingly, the Harbour's ecosystems have been placed under stress as a result of intensive human activities along its shorelines. Since the colonization of the area 250 years ago, Halifax Harbour has been a receptacle for raw sewage and industrial wastes.

Environmental assessments show that acute chemical components in the water and sediments still have great potential hazards to the health of human and biota. Harbour sediments have historically tended to be hotspots of contamination due to direct and indirect cause related to anthropogenic activities developed in the area such as shipping-related activities, industries, presence of highly populated areas, rivers and other discharges. Dredging and disposal processes can release pollutants bound to contaminated sediments and make them available to the biota.

This research findings will be relevant in assisting with recovery plans for threatened and endangered species frequenting the harbour. It will also provide needed information to assist identified sources of the contaminants to mitigate against the continued pollution of these contaminants into the harbour. Similarly, regulators will be provided with recommendations aimed at improving management of priority contaminants through the use of best practices.

Keywords: Halifax Harbour, sediment quality, contaminants, integrated coastal management, coastal environment

Wenhui undertook her internship with the Vancouver Aquarium Marine Science Centre for the Pollution Watch Project (PWP) under the supervision of Dr. Carmen Morales-Caselles and Dr. Peter S. Ross, with the assistance of her academic supervisor Dr. Lucia Fanning. During the four-week internship, Wenhui worked as a team member to organize the two-day Ocean Pollution Solution workshop that brings together experts and stakeholders at all level to work on improving marine environments. Based on research on contaminants, the workshop aimed to establish a cooperative environmental monitoring framework that brings together data, resources, and expertise from multiple collaborating partners. The final report of the workshop was submitted to Department of Fisheries and Oceans (DFO) for future monitoring and regulatory works.

Adrian Gerhartz Abraham

Gerhartz Abraham, A. 2015. Systematic Marine Conservation Planning in the Scotian Shelf Bioregion [graduate project]. Halifax, NS: Dalhousie University.

Abstract

The Scotian shelf bioregion constitutes an area of intense socio-economic activity. Key activities in the bioregion include fisheries, oil and gas, shipping, and aquaculture. However, Canada's commitment to protect at least 10% of the bioregion through networks of marine protected areas (MPAs) will require trade-offs between conservation and other human economic and social activities. This project draws on the principles of systematic conservation planning to explore and assess alternative designs of networks of marine protected area for the Scotian shelf, trying to achieve results that are: 1) effective in meeting conservation goals and 2) efficient in minimizing potential sea-use conflicts among stakeholders. In order to accomplish the former objectives, the project follows a systematic planning approach that allows for the selection of conservation features, the setting of goals and targets and the application of a selection process of conservation sites using Marxan software package and ArcGIS. To minimize cost among other sea uses, spatial distribution of socio-economic activities are used and a reverse Marxan was performed. This enabled to use the selection frequency of the reverse Marxan as a cost layer and therefore determine how to avoid areas that are frequently used for other activities in the bioregion. Results first indicate that the current network is ineffective in terms of representation and efficiency. Second, it identifies new areas that would complement the MPA system and improve the network's adequacy. Finally, it demonstrates how incorporating socio-economic costs can undermine some of the properties of MPA network design, particularly, spatial configuration (size, shape, spacing), and could increase the potential of conflicts with other marine activities not taken into account in the definition of costs.

Keywords: marine protected areas, network design, conservation planning, Marxan, Scotian Shelf Bioregion

Adrian completed his internship with the Oceans and Coastal Management Division of Fisheries and Oceans Canada (DFO) under the supervision of Maxine Westhead. He worked with Marty King on marine protected area (MPA) network design for the Scotian Shelf. Particularly, he used Marxan software to generate different network scenarios in order to help the decision making process. He participated in different technical working group meetings to discuss the implementation process as well as the scientific requirements for improving effectiveness of the proposed MPA network. Adrian also received a Marxan training with PacMARA in Washington DC. Overall, Adrian's project argues that satisfying stakeholder's claims can undermine some properties of MPA network design, particularly, spatial configuration, while increasing the potential of conflicts with other marine activities. His academic supervisor is Maxine Westhead, an adjunct professor in the Marine Affairs Program and Section Head of Protected Areas and Conservation Planning in Oceans and Coastal Management Division, DFO Maritimes.

Julie Hovey

Hovey, J. 2015. Vessel needs, preferences, and restrictions related to minimizing risk to whales without compromising vessel operations and the safety of navigation [graduate project]. Halifax, NS: Dalhousie University.

Abstract

New approaches to large whale conservation make use of autonomous underwater vehicles (AUVs such as ocean gliders) to acoustically detect whales in near real-time, and send ‘whale alert’ information on whale locations to the bridge of commercial vessels to help mitigate vessel strikes to whales. A non-compliant or uninterested commercial fleet may be a barrier to achieving such conservation goals. Thus, understanding the needs, preferences, and restrictions of the shipping industry in the development phase of such new conservation initiatives may result in improved effectiveness. Here I report on a survey questionnaire designed to determine mariner knowledge and awareness of endangered whales and existing conservation measures, and the receptivity of the mariners to near real-time conservation technology on the bridge. The survey, distributed by the Shipping Federation of Canada, yielded 43 responses. The majority of respondents were interested in receiving more information on endangered whales and conservation measures in the eastern Canada and US-Gulf of Maine regions (72% and 79%, respectively). Eighty-four per cent of respondents indicated a preference for receiving information via Navigational telex (Navtex), and 79% listed Navtex as a “not disruptive” means of receiving near real-time whale alerts. Seventy-two per cent of respondents also listed Automatic Identification Systems (AIS) as “not disruptive”, though only 58% identified AIS as a preferred format of receiving whale alerts. Based on the questionnaire findings, mariners appear to be moderately receptive to receiving near real-time whale alerts on the bridge. To better understand the mariner willingness to participate, research should consider defining the response required of mariners when receiving such alerts. The results of this study suggest that future conservation programs should use communication formats that are most familiar to mariners and are least disruptive to the bridge protocols; i.e., Navtex and AIS.

Keywords: Conservation, baleen whales, North Atlantic right whale, Northwest Atlantic, commercial shipping, mariner, receptivity, passive acoustic monitoring

Julie completed her internship with the Marine Environmental Observation, Prediction, and Response Network (MEOPAR) conducting research for the Whale Habitat and Listening Experiment (WHaLE) under the supervision of Dr. Christopher Taggart from Dalhousie University’s Department of Oceanography. During this internship, Julie and the research team partnered with the Shipping Federation of Canada (SFC) to conduct a survey of its membership on the knowledge, awareness, and receptivity of the Canadian shipping fleet to existing and emerging conservation technologies. During her internship, Julie had the opportunity to cruise aboard the Nova Star ferry from Yarmouth, NS to Portland, ME with Dr. Moira Brown to present information on the endangered North Atlantic right whale and the risk of vessel strikes to whales with crew and passengers. In June, Julie presented her research at MEOPAR’s Annual Science Meeting in Vancouver, BC, representing a management perspective of ocean sciences and emphasizing the need for impactful, purposeful research.

Erin Keenan

Keenan, E. 2015. Mobilizing Inuit Qaujimajatuqangit in narwhal management through community empowerment: A case study in Naujaat, Nunavut [graduate project]. Halifax, NS: Dalhousie University.

Abstract

This research examines the relationship between government regulations and the use of Inuit Qaujimajatuqangit (IQ) through a case study focusing on narwhal harvesting in the community of Naujaat, Nunavut. Since Fisheries and Oceans Canada (DFO) introduced a community quota system in 1977, the responsibility for hunting management decision-making has shifted to government (specifically, DFO), rather than hunting communities. This shift corresponds with changes in the use of IQ within the community. Interviews with relevant individuals in Naujaat (including hunters, elders, and representatives from the Hunters and Trappers Organization) were conducted to provide insight into the nature of these changes, allowing the relationship between government-based management policies and community perspectives to be characterized. The findings are used to identify opportunities for improving the relationship between community use of IQ and government management programs, culminating in specific recommendations for the relevant management bodies in Nunavut. These recommendations can enhance the fisheries management regime in Nunavut through better understanding of best practices for inclusion of Inuit priorities and Inuit participation in the management process.

This research is part of the SSHRC-funded Fisheries – Western and Indigenous Knowledge Systems (Fish-WIKS) partnership project, which aims to understand the relationship between western and indigenous knowledge systems in the context of Canadian fisheries policy.

Keywords: Inuit Qaujimajatuqangit, knowledge mobilization, community empowerment, marine mammal management

Under the supervision of Janelle Kennedy, MMM alumnus, **Erin** completed her internship in Iqaluit and Naujaat, NU, with the Government of Nunavut (GN) Department of Environment, Fisheries and Sealing division. As the Master's student for the Arctic component of the Fish-WIKS Project, she conducted research on behalf of Fish-WIKS through its existing partnership with the GN and the community of Naujaat, NU. Her work addressed the relationship between government-based narwhal management programs and the use of Inuit Qaujimajatuqangit (Inuit traditional knowledge) in community-based decision making about narwhal hunting in Naujaat, NU. Her internship involved one week in Iqaluit, where she met with representatives from the Nunavut Wildlife Management Board (NWMB) and Nunavut Research Institute, followed by four weeks of field research in Naujaat. During her time there, she met with the hamlet council and Hunters and Trappers Organization (HTO), and conducted interviews with a range of local narwhal management stakeholders about their views on changes in narwhal harvesting over time. She will analyze the results of her interviews and literature-based research in order to identify opportunities for improving the relationship between communities, government management programs, and Inuit Qaujimajatuqangit, culminating in specific recommendations for the relevant management bodies. This research falls under the umbrella of the Fish-WIKS project's focus on understanding western and indigenous knowledge systems in the context of Canadian fisheries policy.

Helen McConnell

McConnell, H. 2015. Shipping and Seismic Exploration Noise in the Arctic Marine Soundscape: A look at Mitigation Measures for Cetaceans [graduate project]. Halifax, NS: Dalhousie University.

Abstract

Increasing levels of anthropogenic noise in the Arctic marine soundscape can have negative effects on cetaceans that have adapted to a relatively pristine acoustic environment and are unaccustomed to the loud, low frequency sounds associated with activities such as shipping and seismic surveys. This issue was explored first through a literature review on topics related to anthropogenic noise impacts on cetaceans in the Arctic. A detailed examination of three types of mitigation measures; operational, source-based and geographical measures, was then conducted. A review and analysis of the international, regional and national regulatory bodies and policies related to the management of anthropogenic noise impacts in the marine environment that could be applicable to the Arctic region was completed including a comparison of three seismic survey specific guidelines from Canada, the United States and the United Kingdom. Finally, recommendations on how existing policies could be improved are provided. This project highlights the unique challenges the Arctic region faces when it comes to the management of anthropogenic noise impacts in the marine environment, different than those faced in more southern regions, and therefore require a management approach tailored to the Arctic environment. The relatively pristine marine environment, the presence of sea ice, and the higher sensitivity of the cetaceans unaccustomed to human presence and accompanying noise warrant the development of a unique, Arctic specific policy to effectively manage the impacts of anthropogenic noise on resident species such as beluga, narwhal and bowhead whales. The ideal Canadian or regional policy would be based on informed decision making and the precautionary principle.

Keywords: anthropogenic noise; cetaceans; Canadian arctic; mitigation measures; policy; seismic; shipping

Helen completed two internships, one with the Fisheries Management Division of Fisheries and Oceans Canada (DFO) in Vancouver, and the other with NEXUS Coastal Resource Management, based in Halifax. At DFO, Helen worked with Paul Cottrell, the Pacific Marine Mammal Coordinator on various projects including tracking marine mammal response efforts in BC, examining the Joint Marine Mammal Oil Spill Response Plan between Canada and the United States, and assisting with a hydrophone project at the Sand Heads Lighthouse Station. During her internship with NEXUS, she worked with the Nunavut Impact Review Board (NIRB) in Cambridge Bay, Nunavut. Through this internship, Helen was able to secure funding through the Mitacs Accelerate Graduate Research Internship Program (www.mitacs.ca) for travel to Nunavut that allowed her to gain invaluable experience working on environmental impacts assessments, as well conducting additional research for her graduate project. Her graduate project and second internship involved researching the effects of anthropogenic sound in the marine soundscape on marine mammals, with a focus on the Arctic. By conducting both a comprehensive literature review and a policy analysis, Helen will provide invaluable research that will be used by various companies and organizations working in Nunavut. Her academic supervisors were Dr. Claudio Aporta, Director of the Marine Affairs Program, and Dr. Hillary Moors-Murphy, biologist at DFO, Dalhousie Alumni (Ph.D. in Biology) and a member of the National Marine Mammal Peer-Review Committee.

Hillary M^{ac}Donell

M^{ac}Donell, H., 2015. Examining community adaptation readiness to climate change in the Inuvialuit Settlement Region, Northwest Territories [graduate project]. Halifax, NS: Dalhousie University.

Abstract

The current rate of anthropogenic driven climate change is unprecedented and threatening the social, cultural and ecological characteristics of many Arctic communities. The Government of the Northwest Territories, Inuit Organizations, and the scientific community have identified adaptation planning as a priority; however, no formal assessment of community readiness to adapt to climate change has been undertaken in the territory. This study aims to remedy this gap in the adaptation literature through an examination of community adaptation readiness in three communities in the Inuvialuit Settlement Region, Aklavik, Tuktoyaktuk, and Inuvik. This study is the first to examine community adaptation readiness in this region. Using an adaptation readiness framework, the existence of key factors important to adaptation evolution were assessed. The study findings provide needed insights on community adaptation readiness and identifies barriers constricting adaptation action. Recommendations were developed based on these findings to inform regional and local decision makers about proactive and practical efforts that can enhance community readiness. The outcomes of this research can contribute to planning and policy development in the ISR and provide insight on community climate change adaptation in the Canadian Arctic.

Key words: Inuvialuit; climate change; adaptation; western arctic; vulnerability

Hillary completed her internship with the Oceans and Coastal Management Division (OCMD) of Fisheries and Oceans Canada (DFO) at the Bedford Institute of Oceanography. Hillary worked under the supervision of Kattie Calleja and Glen Herbert, MMM Alumni. While completing her internship at DFO, Hillary had the opportunity to participate in inter-governmental meetings and work on a variety of projects, ranging from environmental incident response planning to the conservation of sensitive marine habitats. Hillary gained invaluable experience and skills related to DFO program delivery, project management, stakeholder engagement, outreach, and communications. Her academic supervisor is Dr. James Ford, an Associate Professor at McGill University.

Taylor Mason

Mason, T. 2015. A Role for Inuit: How northern communities can inform and influence the dynamics of offshore oil and gas development in Nunavut [graduate project]. Halifax, NS: Dalhousie University.

Abstract

Climate change and declining ice cover, as well as socio-political and economic incentives, are increasingly attracting corporate attention towards the Canadian North. Oil and gas companies have renewed their interests in extracting these offshore hydrocarbon resources, and are now seeking and receiving exploration licenses to begin their search for oil throughout Nunavut's offshore. In the Baffin Bay and Davis Strait, seismic surveying for oil and gas is scheduled to begin in the summer of 2016, leaving the government with a limited time frame to create and establish legislation that will define the role Nunavummiut in these developments. The Nunavut government is the only Canadian legislation that has publicly promised to incorporate local Inuit perspectives and knowledge into all aspects of its operations, including oil and gas. Valuable information about the territory's socio-economic and natural environment is embedded within Inuit knowledge, and can serve to inform policy development for the industry. Within the current context, can Inuit knowledge be effectively incorporated in the development of an offshore oil and gas policy? This research will look at the potential means to bring community members and knowledge holders to the decision-making table, and the effectiveness of these processes within offshore oil and gas development in Nunavut.

Keywords: Inuit knowledge; offshore oil and gas; policy; Arctic; Nunavut; hydrocarbon development; Northern governance; community consultation

Taylor completed her internship with the Qikiqtani Inuit Association (QIA) in Iqaluit, Nunavut under the supervision of the Director of Lands and Resources, Rosanne D'Orazio. Taylor's graduate project and internship is focused on assessing Inuit participation and community involvement in policy development for offshore oil and gas in Nunavut. Taylor spent her time in Iqaluit preparing a feedback report for the QIA outlining thirteen recommendations based on QIA's mandate. The report was based on information gathered from Nunavut Tunngavik Incorporated's (NTI) Policy Background Paper for Offshore Oil and Gas Development in Nunavut, NTI's draft policy framework for a seismic policy, relevant reports and literature, and the student's own understanding of the various processes and activities involved in these developments. This experience provided Taylor with access to the expertise and knowledge base of the QIA, which helped to support and shape her final graduate project.

Kimberly Vardon

Vardon, K. 2015. Examining the Feasibility of Implementing Marine Mammal Oil Spill Response in Canada [graduate project]. Halifax, NS: Dalhousie University.

Abstract

The coastal waters surrounding Canada are home to diverse ecosystems that provide rich feeding grounds and critical habitat for many marine species. Marine mammals face numerous anthropogenic threats to their recovery and preservation. They are physically exposed to oil through direct deposition, ingestion, or inhalation of toxic vapours at the water-air interface. The adverse effects of oil exposure are dependent on the type of oil encountered and the amount and means of exposure. There are several activities that take place in Canada's Exclusive Economic Zone, which have the ability to harm marine mammals by leaking toxic substances into the water-column. There are real, perceived, and potential risks, in addition to transboundary agreements and federal obligations to protect marine resources that warrant the creation of federal marine mammal oil spill response. In an effort to meet national and international obligations, the development of a marine mammal oil spill response protocol is a relatively low cost endeavour that can mitigate high risk scenarios and should be integrated into wider Spill Management Systems for marine oil spills. Through the utilization of the current marine mammal response network, Fisheries and Oceans Canada (DFO) can provide training to responders that could be funded through the Marine Mammal Response Program. Response will be most feasible and effective if DFO works with Transport Canada to amend the *Response Organization's and Oil Handling Facilities Regulations* to include marine mammal response and rehabilitation, as the polluter would have to cover costs associated with response as opposed to the government.

Keywords: marine mammals, oil spill, response, rehabilitation, Canada, response organizations

Kimberly completed her internship at Fisheries and Oceans Canada (DFO) with the National Fisheries Policy bureau in Ottawa, ON. She worked closely with the national Marine Mammal Coordinator, Melissa Landry (MMM alumna) under the supervision of Marc Clemens. Over the summer Kimberly contributed to several resource management projects and collaborated with other branches within DFO. Her main tasks revolved around the operation of the Marine Mammal Response Program, which aligned well with her project. Kimberly's graduate project, supervised by Dr. Pierre-Yves Daoust from the University of Prince Edward Island's Atlantic Veterinary College, aimed to provide an overview of the effects of oil on marine mammals and offer an examination of Canada's existing capacity to respond to distressed marine wildlife.

Maryann Watson

Watson, M.S., 2015. Bycatch 22: Regulatory pressures of selective fishing on commercial salmon fishers and impacts of handling on chum salmon (*Onchorhynchus keta*) released from purse seine fisheries in Northern British Columbia. [graduate project]. Halifax, NS: Dalhousie University.

Abstract

In Canadian Pacific salmon fisheries, a policy of selective fishing practices was introduced to reduce impacts on salmon populations of conservation concern while allowing fisheries to continue on species that can withstand fishery exploitation. The outcomes of this policy have resulted in fundamental changes in the operation of commercial salmon fisheries in British Columbia. Recently, concerns have been raised that noncompliance with selective fishing policies and handling regulations are resulting in higher post-release mortality of chum salmon than is sustainable for populations on the north coast of British Columbia. Fishery- or species-specific recommendations do not exist for handling practices in salmon purse seine fisheries, and social factors, such as stakeholders' perceptions of regulations, can be determining factors in the success of conservation actions. In this project, I assess both biological and social factors of chum salmon bycatch handling and release in the commercial purse seine fishery on the north coast of British Columbia. Reflex action mortality predictors (RAMP) are used to assess the effects of air exposure and fishery handling on chum salmon and suggest that reducing air exposure time to below three minutes will maximize the condition of released fish. Interviews with fishermen, fishery managers, and members of non-governmental organizations on perspectives toward selective fishing regulations reveal that fishers attitudes towards these regulations are a primary determinant of compliance and that improved communication and feedback between management and resource users is needed to rebuild trust between stakeholders.

Keywords: *Pacific salmon, commercial fishing, selective fishing, RAMP, human dimensions, stakeholders*

Maryann interned with the Watershed Watch Salmon Society and collaborated with the University of British Columbia's Pacific Salmon Conservation and Ecology lab on a project examining the handling methods of incidentally caught chum salmon in the pink salmon purse seining fishery on BC's North coast. This project aims to improve handling practices of these chum salmon before they are released through study of their physiology, injury sustained from fishing and handling, and their vitality when brought onboard. All of these factors contribute to the post-release survival of the fish. Maryann interviewed fishermen and managers of the fishery in this area to gain a better understanding of the opinions of commercial Pacific salmon fishers on suggested handling practices for salmon bycatch and to learn more about practical solutions to current management issues within the industry and opinions on how to improve survival of released fish. Maryann also assisted with the vitality study onboard purse seine vessels during the fishery. The goal of this project is to improve handling of salmon bycatch in this fishery such that more chum salmon survive to spawning post-release from the pink salmon fishery.

Kascia White

White, K. Q.L. 2015. Applying Adaptive Management Approaches to Data Limited Fisheries: The Case of Bermuda's Shallow Water Snapper Species [graduate project]. Halifax, NS: Dalhousie University

Abstract

The sustainable management of ecosystems, marine resources, and resource users is essential to ensure ecosystem health and resilience. A vast majority of global fish stocks lack adequate data to determine fish stock health using conventional fish stock assessment methods. These fisheries are often left unmanaged causing dramatic declines in fisheries health and potential economic and socio-cultural losses to coastal communities. To address these data limitations, fisheries managers are incorporating data-limited methodologies to scientifically assess fish stocks, estimate overfishing and set catch limits. With the dynamic nature of the natural environment, it is important that management strategies are adaptive and continually restructured. With limited biological data available for the shallow water snapper species in Bermuda, and limited resources to collect additional data, new methods of managing these species need to be considered. This research examines the options for adaptively managing Bermuda's shallow water snapper species by incorporating fishers' knowledge with current data-limited approaches.

Keywords: Bermuda; shallow water snapper; data-limited fisheries; adaptive management; fisher knowledge; Lane snapper; Grey snapper; Yellowtail snapper; ecosystem-based fisheries management; FISHE framework; compliance; enforcement

Kascia undertook an internship with the Department of Environmental Protection (DEP): Marine Resources Section, Bermuda, under the supervision of Dr. Joanna Pitt, Marine Resources Officer. Kascia worked on analyzing fisheries databases for shallow water snapper species to aid in understanding how fish stocks react to their environment and increased fishing pressures. In addition, she conducted surveys with local commercial and recreational snapper fishers. Kascia hopes that this research will aid in determining how Bermuda's snapper fishery can be more efficiently managed and propose an effective management strategy. While at the DEP, Kascia also assisted with the Bermuda Lionfish Control Plan that involved deploying and collecting deep-water lionfish traps at known lionfish aggregation sites. Her academic supervisors are Dr. Tammy Trott, Senior Marine Resources Officer and Mr. Paul Fanning, Chief Technical Advisor, Fisheries and Aquaculture Organization (FAO), Pakistan.