Dalhousie University's Marine Affairs Program Presents

SUSTAINABLE OCEAN 2023 CONFERENCE

September 23-24, 2023 | Halifax Convention Centre

TURNING TIDES

Sustainable Ocean Conference 2023

SUSTAINABLE OCEAN CONFERENCE

The Sustainable Ocean Conference is located on the ancestral and unceded territory of the Mi'kmaw People—the past, present, and future caretakers of this land. Mi'kmaw People thrived on and cared for this land long before John Cabot arrived on the shores of Mi'kma'ki in 1497 and occupied what we now know as the Atlantic provinces. Today, Mi'kmaw leaders across five bands in Mi'kma'ki advocate for the protection of Aboriginal and Treaty rights whilst pursuing a prosperous future for Mi'kmaw peoples that is rooted in Indigenous sovereignty and culture. Throughout the weekend, we look to respect and promote the role Mi'kmaw researchers, practitioners, and community members while creating and holding space for conversations regarding truth and reconciliation within marine management. We are all Treaty people.

The Sustainable Ocean Conference is a free event that brings together a wide audience to create opportunities for collaboration and education that address the range of issues affecting our ocean. The conference is supported by the Sobey Fund for Ocean and is organized by Master of Marine Management Candidates (MMM) of the Marine Affairs Program at Dalhousie University. It is the only student-led conference of its kind in Atlantic Canada and is being held for the 12th consecutive year.

This year's theme is Turning Tides. We look to embrace a new chapter of marine management that promotes the interdisciplinary, intersectional, and intergenerational nature of the ocean science field. Together we will explore what it means to research, work, and co-exist in this ever-evolving space, through insightful keynote presentations, an innovative panel discussion, and a showcase of exceptional research. We look forward to turning the page, and shifting the way we view a sustainable ocean together!

THE THREE I'S OF TURNING TIDES

INTERDICSIPLINARY

INTERSECTIONAL

INTERGENERATIONAL

SOBEY FUND FOR OCEAN

The Sobey Fund for Ocean is made possible by a generous and innovative gift by Donald R. Sobey in 2013. It is a unique partnership that was formed by the Marine Affairs Program at Dalhousie University, “Canada’s Ocean University” in Halifax, Nova Scotia, and WWF-Canada, a leader in marine conservation. The goal of the Sobey Fund for Oceans is to inspire innovative multi-disciplinary approaches for creating healthy oceans and sustainable economies. The Sobey Fund for Ocean provides resources to support scholarships and work placements to help tomorrow’s leaders see “beneath the surface” of our oceans’ problems to find lasting solutions.

SOBEY FUND FOR OCEANS

Sobey Fund for Ocean Advisory Group: Dr. Jerry Bannister, Dr. Lucia Fanning, Dr. Jon Grant, Becky Field

MARINE AFFAIRS PROGRAM

The Marine Affairs Program (MAP) at Dalhousie University provides an inquiring and stimulating interdisciplinary learning environment to advance the sustainable use of the world’s diverse coastal and ocean environments. In education, research and outreach, MAP seeks to develop outstanding marine management professionals by building on extensive global-to-local marine management networks. MAP works with other educational, governmental, NGO, and private sector organizations to promote and conduct timely and relevant interdisciplinary research in a broad array of scholarly topics that is attractive to students and conducted by a team of world-class researchers.

Marine Affairs Program

Telephone: (902) 494-3555
Email: marineaffairs@dal.ca

WWF-CANADA

World Wildlife Fund (WWF) is one of the world’s largest and most renowned leaders in conservation. As part of the WWF global network, founded in 1961 and active in more than 100 countries, WWF-Canada actively contributes to the achievement of the organization’s mission: to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature. WWF-Canada has an ambitious national oceans program and eight offices across the country. The Atlantic Region is home to two of them, one in Halifax, NS since 2001 and one in St. Johns, NL since 2007, both of which focus on issues pertaining to marine conservation.

WWF

Website: https://wwf.ca

WELCOME

On behalf of the 2022-2023 Marine Affairs Program students, we would like to warmly welcome you to the 2023 Sustainable Ocean Conference: Turning Tides.

When we began to conceptualize this year's conference, we kept coming back to the idea that as the ocean around us changes, we too need to embrace a new way of exploring what sustainability in the marine and coastal space looks like from a variety of lenses—what matters most to us as researchers and practitioners? Who is at the forefront of change and decision-making? And what does this mean for future generations? These questions brought us to this year's theme: Turning Tides.

We wanted to create a space where we, as a community of academics, industry professionals, and decision-makers, could conceptualize what it means to turn the page to a new chapter of sustainable marine management, one that values the interdisciplinary, intersectional, and intergenerational nature of the ocean science field.

We understand that truly sustainable management requires the consideration of social, environmental, and economic dimensions and that our work is only enhanced when we are encouraged to bring our whole selves to the table and when this table includes more individuals than those who are historically in positions of power. Lastly, we value the need to make decisions based on the core principle of sustainability, ensuring that those who come after us are able to thrive in the marine and coastal environments we leave behind.

Over this weekend we will explore what it means to research, work, and co-exist in this ever-evolving space, through insightful keynote presentations, an innovative panel discussion, and a showcase of exceptional research. Thank you very much for supporting our student-led initiative and we hope you enjoy this year's Sustainable Ocean Conference!

Sincerely,

ABIGAEL KIM

ALEXANDRA FRIEDMAN

AIMÉE HOPTON

CONFERENCE CO-CHAIRS

MASTER OF MARINE MANAGEMENT CLASS OF 2022-2023

CO-CHAIRS

Abigael Kim Alexandra Friedman Aimée Hopton

MARKETING TEAM

Joy Rivers (Lead)
Quinna Laver
Lyle Porter
Adam Williamson

LOGISTICS TEAM

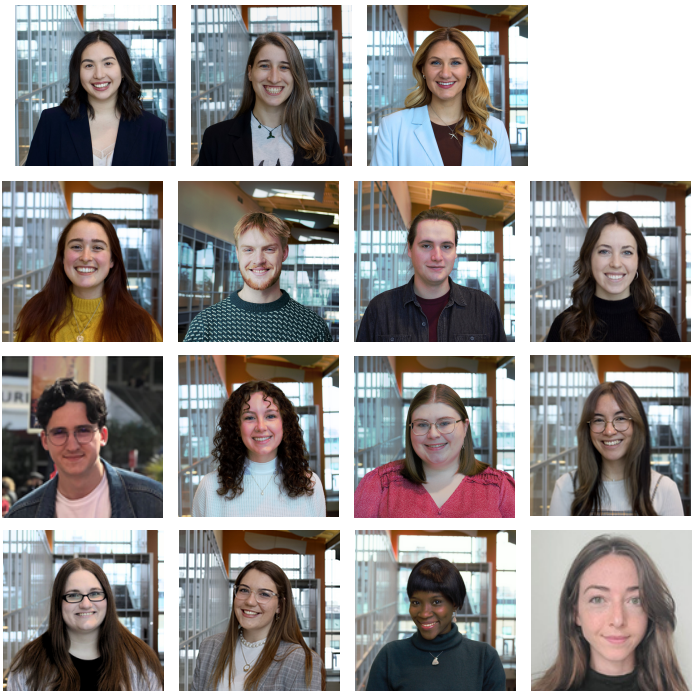
Katrina Côté-King (Lead)
Jumanah Khan (Lead)
Benjamin Fillier
Claire Kleinknecht
Brianna Crosby

FUNDRAISING TEAM

Megan Shin (Lead)
Taylor Watts
Julie Gaal

SUBMISSIONS TEAM

Reid Sutherland
Grace Akinrinola
Therese Wilson



SFO SCHOLARSHIP RECIPIENTS 2023/2024

BRENNA NOBLE

"I express my heartfelt gratitude to the Sobeys Fund for Ocean for their support in my pursuit of an MMM. I have always felt motivated to bring about positive change, though I never knew where to start. My undergraduate education opened my eyes to the intricate challenges we face at the intersection of social, economic, and environmental issues and interests, and exposed me to how a marine setting can add another layer of complexity. This propelled me to focus my research on investigating conservation and human food security challenges that arise when oceanic socio-environmental systems lack resilience. I am eager to develop a better understanding of how human and environmental spheres can better co-exist through adaptive environmental management and co-management. We know that social and economic futures are deeply intertwined with the rapid ecological shifts our oceans are experiencing due to climate change. Equipped with the knowledge and expertise I will acquire with the MMM program, I aspire to play an active role in the cultivation of resilient socio-environmental systems in a rapidly changing environment and increasingly demanding economy. I would again thank the Donald R. Sobey Foundation for supporting me through this endeavour."

KALI HINES

"I am thankful for the support the Sobeys Fund for Ocean scholarship has provided me as I continue my graduate studies at Dalhousie in the Marine Management program. With an interdisciplinary background in the humanities and ESS, I am looking forward to expanding my knowledge on co-management practices and learning more from educators, professionals, communities, and fellow students in the MMM program. I am passionate about how Indigenous knowledge, governance, and collaboration can create stronger and more resilient marine ecosystems in other NS communities and I am excited for the next 16 months at Dalhousie."

SFO SCHOLARSHIP RECIPIENTS 2023/2024

GITA TSOMIK

“I am very honoured to be a recipient of the Sobeys Fund for Ocean Scholarship. I am extremely grateful for the opportunity to pursue my Master of Marine Management program at Dalhousie University. I have been passionate about the oceans and amazed by the intricate aquatic ecosystems that they hold, ever since I was a little girl. With my Marine and Freshwater Biology degree from the University of Guelph, I have acquired knowledge about the anthropogenic environmental impacts on our oceans and have researched how these factors impact marine organisms and their ecosystems. Through the Marine Management program, I hope to learn how to effectively manage the impact of anthropogenic factors on the oceans and make a significant change. In particular, I am interested in integrating the knowledge and management practices held by local Indigenous nations with scientific evidence to manage aquatic areas in need of protection and provide the general public with awareness.”

MARIA MASON

“I am extremely honoured and excited to have received a Sobey Fund for Ocean scholarship as I begin the Master of Marine Management program. After completing a biology degree and working in the marine field for a few years, I am looking forward to expanding my knowledge in a more interdisciplinary context and meeting peers and colleagues with the same passion for the ocean that I have developed. This award is allowing me to pursue my dream of working in cetacean conservation while gaining skills in management and public outreach. I hope to learn more about how different sectors collaborate in making management decisions and improve my abilities in data analysis.”

SCHEDULE

DAY 1

9-10	Registration	
10-10:30	Opening Remarks	★★
10:45-11:45	Oral Session: Society and Science	★★
11:45-12:45	Lunch	
12:45-1:30	Ocean Showcase	★★★
1:30-2:30	Keynote: Dr. Cinda Scott	★★
2:30-2:45	Break	
2:45-3:45	Oral Session: Policy and Planning	★★
3:45-4	Closing Remarks	★★

DAY 2

9:30-10	Registration	★
10-10:15	Opening Remarks	★★
10:15-11:15	Oral Session: Economy and Environment	★★
11:15-12:15	Brunch	
12:15-1	Poster Presentations	★★★
1-2:15	Panel: Sustainability in Action	★★
2:15-2:45	Closing Ceremony	★★

★★★ *Room 201*

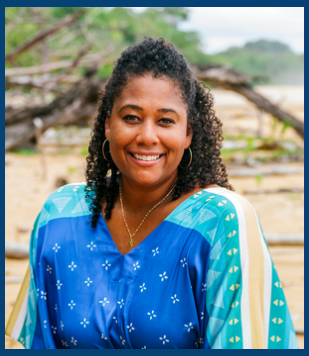
★★ *Main Room*

★ *Argyle Foyer*

SPEAKERS

We are so fortunate to have an incredible lineup of innovative and exciting individuals for you to hear from at SOC.

KEYNOTE



DR. CINDA SCOTT

Center Director,
School for Field Studies Panamá

PANELIST

DR. SHELLEY DENNEY

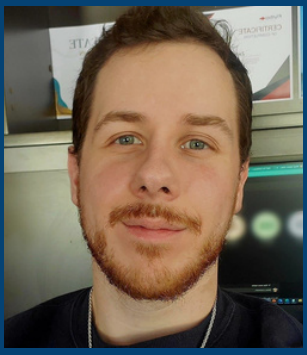
Senior Advisor,
Unama'ki Institute of Natural Resource

PANELIST

DR. JAMIE SNOOK

Executive Director,
Torngat Wildlife Plants and Fisheries Secretariat

PANELIST



ZACHARY SABEAN

Renewable Energy Engagement Coordinator,
Confederacy Of Mainland Mi'Kmaq

ORAL SESSION 1
"SOCIETY AND SCIENCE"

Grace Akinrinola

Promoting Reconciliation and Indigenous Self-Governed Fisheries through Ecosystem-Based Management

Sipekne'katik First Nation launched their Mi'kmaw-regulated, rights-based lobster fishery in the fall of 2020. The launch came 21 years after the Supreme Court reaffirmed the treaty-protected right to fish for a moderate livelihood and was met with harassment, violence, and racism, setting off a nationwide awakening to the issue of Treaty fisheries implementation. At the same time, Fisheries and Oceans Canada (DFO) in the Maritimes Region has been developing an Ecosystem-Based Management (EBM) Framework encompassing Governance, Social/Cultural, Economic, and Ecological objectives to support integrated fisheries management. The extent to which this initiative could support reconciliation is currently unknown. This project studies how the DFO's emerging Ecosystem-Based Management (EBM) Framework supports reconciliation. The study relies on documents, for example, the DFO Maritimes EBM Framework, DFO-Coast Guard Reconciliation Strategy, and an Indigenous-led Reconciliation Framework linked to the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), as well as meetings involving the academics and DFO scientist to identify opportunities for the EBM Framework to support reconciliation. Findings identified areas where the EBM Framework could be the vehicle for reconciliation and other areas requiring further development of its pillars and objectives. In cases where these responsibilities extend beyond the mandate of DFO, Canada must address those injustices through other channels. Promoting Reconciliation and Indigenous Self-Governed Fisheries through Ecosystem-Based Management could help promote healing and justice for Indigenous peoples, ensuring they have a meaningful role in ocean management decision-making and creating a more equitable and sustainable future for all.

Caitlin Bate

Pairing ways of knowing to understand valued aquatic species in the Bras d'Or Lake

Apoqnmatulti'k (Mi'kmaw for we help each other) is a partnership that emerged out of a shared desire to advance a collaborative research model that would help to better understand valued aquatic species in the Bras d'Or Lake and Bay of Fundy ecosystems. Historically, western scientific knowledge has been relied upon as the dominant paradigm for informing aquatic resource conservation and management. As a result, key perspectives by Indigenous and coastal communities are often missing from management and research. Excluding these perspectives has limited our understanding of aquatic ecosystems and resulted in inadequate measures for sustainable oceans. Apoqnmatulti'k is guided by the principle of Etuaptmumk, or Two-Eyed Seeing, which refers to learning to see from one eye with the strength of Indigenous knowledge and ways of knowing, and from the other eye with the strength of western knowledge and ways of knowing. Research questions and study species are informed by Mi'kmaw and local community members and co-developed by all research partners. Mi'kmaw values are incorporated into the study design and methodology in order to minimize harm to species and the ecosystem. Mi'kmaw and local harvesters work with western academic researchers to conduct tagging activities and maintain acoustic receivers. Acoustic data is paired with Mi'kmaw and local knowledge to provide an understanding of changes in species distribution and habitat use within the Bras d'Or Lake. The research project reveals how meaningful collaboration among diverse knowledge holders is critical to understand, manage, restore and protect valued aquatic species in the Bras d'Or Lake.

ORAL SESSION 1
"SOCIETY AND SCIENCE"

Quinna Laver

Bridging Knowledge and Cultivating Stewardship: A Case Study Exploring Inuit-led Marine Education in the Context of Co-Management in Nunatsiavut

Marine education plays a key role in equipping individuals and communities with the knowledge necessary to manage complex challenges associated with our changing ocean. In Nunatsiavut – a unique self-governing Inuit territory in northern Labrador – being competent on the land and water has been integral to well-being, economies, and culture since time immemorial, and continues to this day. Consequently, there is a wealth of coastal knowledge and stewardship. However, the K-12 education system is administered by the Province of Newfoundland and Labrador and does not reflect the values of Labrador Inuit or include culturally relevant content. Additionally, colonial forces of dispossession, governance injustices, and residential schools have disrupted intergenerational knowledge transfer. Considering these events, the Torngat Secretariat – a co-management institution created under the Labrador Inuit Land Claims Agreement – has initiated the Paigitsiaguk project ("taking care of it" in Inuktitut), which seeks to develop interdisciplinary education kits for schools in Nunatsiavut based on culturally important species. This study employs a qualitative research design by combining literature scan and content analysis to analyze literature for calls for action on Inuit education and how they might be met by the Paigitsiaguk Project. Using the Putjotik (Snow Crab) education kit as a case study, this project explores how Inuit, local, and science knowledge can be bridged and communicated in K-12 provincial science and social studies curriculum. Finally, this study also explores the diverse ways in which co-management institutions such as the Torngat Secretariat contribute to sustainable marine stewardship and self-determination through education interventions.

Therese Wilson

Sea and Society: Exploring Nova Scotian's Aesthetic Values and Preferences for Ocean and Coastal Spaces

Nova Scotia is home to diverse marine social-ecological systems (SES) that encompass a range of activities, landscapes, and industries that are socially, economically, and environmentally important. These coastal and ocean systems provide the foundation for the livelihoods of coastal communities and supply vital ecosystem services such as food and coastal protection. Marine and coastal spaces also provide non-material cultural benefits, or cultural ecosystem services (CES), in the form of enjoyment, inspiration, and aesthetic experience, all which support human wellbeing. Understanding and evaluating CES can help decision-makers identify potential conflicts and improve social sustainability in the context of marine development initiatives and marine spatial planning. While modern sustainability frameworks such as ecosystem-based management have increasingly recognized the need to understand and consider social conflicts and values, there are still significant gaps in understanding the CES provided by marine and coastal SES. In particular, there is little focus on evaluating what contributes to people's aesthetic values and preferences. To investigate the aesthetic CES provided by marine and coastal social-ecological systems, a modified visual preference survey explored the aesthetic values and preferences of Nova Scotians. The survey sought to capture respondent's preferences for different seascapes and their associated aesthetic features. Findings will illustrate the types of marine uses that are visually preferred by Nova Scotians, and how factors like socio-demographics, people's interactions, values, and perceptions towards coastal uses and landscapes influence those preferences. This study will help improve the knowledge of how ocean and coastal spaces are valued and inform efforts for more sustainable marine planning of coastal spaces for future generations.

ORAL SESSION 2
"POLICY AND PLANNING"

Alexandra Friedman

The effects of North Atlantic right whale fishery closures on entanglement risk to other large whales in the Gulf of St. Lawrence

The endangered North Atlantic right whale (NARW) suffered a mass mortality event in 2017 which resulted in 17 whale deaths across their range due to vessel strikes and entanglements in fishing gear. Since 2018, time-area closures have been implemented in Canadian waters to reduce entanglements of NARW in fixed-gear fisheries, particularly the snow crab fishery. Other large baleen species also occur in the Gulf of St. Lawrence (GSL) and face similar risks of entanglement from fixed-gear fisheries. These include endangered blue whales, fin whales (special concern), and humpback whales, the second most commonly entangled baleen whale in Atlantic Canada, and other studies have shown the rate of entanglement for these whales in the GSL are vastly underestimated (Ramp et al 2021). The goal of this study was to estimate the risk of entanglement in snow crab gear for these other species, and to quantitatively evaluate the potential change in risk due to the NARW time-area closures. Distributions for each species were based on annual sightings (2015-2022) using a location uncertainty model and combined with snow crab logbook data to estimate entanglement risk. The average risk of entanglement for blue, fin, and humpback whales was estimated for the years prior to the implementation of fisheries management measures (2015-2017) and compared to the entanglement risk estimate for each year with time-area closures (2018-2022) to identify the change. These results provide important information on the effects of fisheries management measures on non-target whale species.

Claire Kleinknecht

Offshore Wind Farms and Marine Protected Areas: Friends or Foes?

In a marine environment of competing human uses, decision-makers have been forced to transition to renewable energy alternatives like offshore wind (OSW) while protecting ocean biodiversity in Marine Protected Areas (MPAs). OSW energy has been internationally accepted as an economically viable green energy alternative to conventional carbon-emitting sources, with the long-term goal g. Nova Scotia looks to procure its own OSW industry and has set targets for renewable energy with a specific leasing target of five gigawatts by 2030. Although OSW is posed as a green energy source, questions continually arise regarding the environmental impacts of the technology and its compatibility with marine conservation initiatives, including MPAs. MPAs have gained global support via the International Convention on Biological Diversity which targets protection for 30% of coastal and marine areas by 2030. This study aims to evaluate the compatibility of OSW and future MPAs in Canada through an environmental risk assessment (ERA) using a literature review. The ERA uses a case study of Canso and Middle Banks, a potential future site, to investigate how OSW will impact an Oceans Act MPA. The environmental risk assessment of Canso and Middle Banks will estimate the magnitude of OSWs impacts to conservation priorities and objectives to discern suitability. The outcomes of this project will help managers understand the potential compatibility between OSW and MPAs and provide a set of recommendations to provincial and federal regulatory bodies to ensure both the safeguarding of marine ecosystems and advancing decarbonization for generations to come.

ORAL SESSION 2
"POLICY AND PLANNING"

Taylor Watts

Adaptive capacity of marine other effective area-based conservation measures (OECMs) in an era of global climate change: a case study analysis of Canada and the Scotian Shelf.

Marine protected areas (MPAs) are often designed and managed without considering the implications of climate change, potentially undermining their long-term efficacy. Other effective area-based conservation measures (OECMs) are a critical and relatively new conservation tool that can acknowledge areas delivering conservation benefits that otherwise do not qualify as MPAs. Marine OECMs are potentially more adaptive than MPAs, which are often entrenched in legislation, because OECMs can be implemented using more flexible regulations. Marine OECMs in Canada come in the form of marine refuges – fisheries closures established through regulations under Canada's Fisheries Act. As Canada advances marine conservation targets to protect 30% of its marine and coastal areas by 2030 through both MPAs and OECMs, it is imperative that OECMs are designed and managed such that they can be adapted as climate change impacts emerge to continue to deliver conservation benefits. This work builds on five adaptation domains described in the scientific literature in the context of climate adaptation in coastal communities, redefining them in the context of protected areas, particularly OECMs, and applies them to OECMs in the Canada and its Scotian Shelf Bioregion. This research explores the assumption that OECMs may be more adaptive than legislated MPAs and provides guidance for developing truly adaptive conservation measures in the era of global climate change.

Adam Williamson

Examining the Canadian Shellfish Sanitation Program in Nova Scotia Through a Food Security Lens: Management For Subsistence Shellfish Harvest

Defined here as molluscan bivalves, shellfish are an important source of protein for subsistence harvesters in Canada.Shellfish are at high risk of contamination from marine pollutants and consumption of contaminated shellfish presents a serious threat to human health. This necessitates routine testing and monitoring to ensure the safety of shellfish. This responsibility falls to a federal program called the Canadian Shellfish Sanitation Program (CSSP). Although the CSSP is the sole authority for ensuring sanitary shellfish products, the program's core mandate and resources have not been renewed for decades, prompting program downsizing in Nova Scotia (NS). The core mandate of the CSSP focuses on food safety for commercial and exported shellfish products, raising the question of whether the program addresses the needs of subsistence shellfish harvesters; program delivery in areas of current or potential subsistence harvest impacts people's ability to harvest wild food and therefore their food security. This project aims to analyze the CSSP from a food security lens by answering two research questions: what are the impacts of CSSP on subsistence food security in NS; and, is the federal CSSP model structured to meet food security needs in NS? We endeavor to answer these questions using semi-structured interviews with federal and provincial government staff using a snowball sampling technique, resulting in thematic coding analysis of interview transcripts. Preliminary findings suggest a severe lack of program resources and institutional incompatibilities that together act as barriers to subsistence food security, potentially impacting Canadians who utilize, or could utilize shellfish resources.

ORAL SESSION 3
"ECONOMY AND ENVIRONMENT"

Katrina Côté-King

Tuna of the Indian Ocean: How a centuries old Maldivian fishery has achieved MSC certification and undertaken a conservation burden in the IOTC

The management of highly migratory fish requires international collaboration to ensure long-term stock sustainability. The Indian Ocean Tuna Commission (IOTC) manages tropical tuna species among 30 contracting parties (CPCs), including historically underrepresented coastal nations and distant water fishing fleets. The Maldives, a small island developing state (SIDS) located in the Southwest Indian Ocean, has been reliant on tuna fishing for millennia to ensure food security and economic development, all the while practicing environmentally sustainable harvest techniques. The Maldives' pole-and-line skipjack tuna fishery was also the first in the region to achieve Marine Stewardship Council (MSC) certification in 2012. The goal of this research project is to understand the social, economic, and environmental impacts that Maldives-certified tuna has entailed both locally and for surrounding Indian Ocean fisheries. How the MSC has shifted tuna value chains and whether the standard adequately considers ecosystem impacts of fishing gears was also explored. Data was collected through a literature review, Q-sort, and semi-structured interviews, which were subsequently coded using NVivo 1.7.1 (a qualitative data analysis software). The role of the MSC in adequately addressing environmental concerns, allowing capacity building among SIDS, and shifting consumer perspectives in international tuna markets is evaluated. This research project also touches on future projections for the Maldives and surrounding fisheries, innovative techniques to improve harvest sustainability, and addresses the overlooked social component that is foundational to Maldivian tuna fisheries.

Aimée Hopton

Indigenizing the Blue Economy in Aotearoa New Zealand

Climatic changes have presented new threats to the wellbeing of coastal and marine environments, necessitating governments to invest in long term strategies that support sustainable growth in the marine sector. Commonly known as the blue economy or blue growth, this approach supports marine and coastal activities that generate economic value, are climate resilient and contribute positively to social, cultural, and ecological well-being. Additionally, objectives of the blue economy are linked to the distribution of benefits and resource ownership through responsible negotiations with stakeholder groups and Indigenous Peoples. Therefore, embedded in its development, blue growth should reinforce the values, rights, and interests of Indigenous Peoples as an asset to marine economic activities. In the context of Aotearoa New Zealand, further drivers towards a blue economy include the requirement and opportunity of incorporating Te Ao Māori world views into resource management. The Sustainable Seas National Science Challenge: Project 2.3 - Indigenizing the Blue Economy, synthesizes how mātauranga Māori perspective and tikanga-guided business models can empower Māori fisheries in the long-term development of restorative marine economic activities. This analysis contributes to a broader understanding of what change is required to enable Māori fisheries companies to implement kaitiakitanga & rangatiratanga in their market operations. Drawing on ethnographic research and author participation in a Māori-led research effort to "Indigenize" the blue economy, the following study will describe the approach Māori scholars are taking to understand and advance Māori self-determination, and the commercial terms that would facilitate or inhibit development in the Māori marine economy.

ORAL SESSION 3
"ECONOMY AND ENVIRONMENT"

Abigael Kim

The Social 'Cost' of a Blue Economy: Exploring Local Frustrations Surrounding Tourism Development and Public Utility Access in Bocas del Toro, Panamá

Introduced in 2012, the blue economy (BE) is an ocean-wide sustainable development strategy that aims to improve human well-being while reducing environmental risks and ecological scarcities. Given that it can only be considered sustainable if social equity is prioritized above economic and environmental dimensions, questions of whether a BE serves the interests of underserviced coastal communities have emerged. This study explores the social implications of a BE in Bocas del Toro, Panamá, where widespread water shortages have led to frustrations regarding public utility access and ecotourism development and frictions between the public and private sectors. To do so, the following objectives are pursued: 1) documenting the experience of some community members in Bocas del Toro with fresh water shortages, including how they perceived the roles played by the government and tourism development, 2) examining whether shortages have influenced regional policies and investment regarding public utilities, and the extent to which tourism development undermines or promotes such changes, and 3) exploring how Panamá's BE strategy can reconcile aspirations for a sustainable ocean sector and the public utility needs of local communities in Bocas del Toro. The findings of this study will support future academic conversations surrounding the social implications of BE development, in underserviced coastal communities in particular, and lend itself to additional research in the Bocas del Toro Archipelago, as communities continue to advocate for socially sustainable and equitable development.

Ronnie-Noonan-Birch

Applying the SDGs in a Framework to Asses Blue Economy Capacity of Industry Operators in Canada

Canada has committed to growing a blue economy grounded in sustainability but has not yet established a sustainability standard that industry operations must meet to be included in the blue economy. For the blue economy to be an effective, sustainable alternative to the regular ocean economy, an assessment framework that facilitates benchmarking and blue economy performance comparisons for ocean industry is needed to reduce the risk of bluewashing. This research uses the UN Sustainable Development Goals as a theoretical backdrop to generate industry blue economy aims and subsequent mechanisms that can assess a company's blue economy capacity i.e., their contribution to a socially equitable, environmentally sustainable, and economically viable blue economy. Ground-truthing methods corroborated that this framework is a needed tool for companies to improve their blue economy capacity and for regulators to make informed decisions on the development of Canada's blue economy.

POSTER SESSION
EXCEPTIONAL MARINE RESEARCH

Brianna Crosby

A Scoping Review of European and Atlantic Canadian Green Crab (Carcinus maenas) Fisheries Literature

Aquatic invasive species are considered economic and environmental threats to Canada's shores. For Atlantic Canada, the European green crab (Carcinus maenas) is a management concern due to its destructive nature. The green crab is an aggressive predator that disrupts ecosystems by outcompeting native decapods, destroying critical habitat, and causing a loss of biodiversity. Additionally, green crabs affect Atlantic Canadian fisheries by preying upon commercially important species. A potential management solution is the use of green crab fisheries to control the invasive population in Atlantic Canada. Green crab fisheries in the species' native European range have been reported as successful and as such, small trial fisheries have been established in Atlantic Canada. This study aims to conduct a scoping literature review of European and Atlantic Canadian green crab fisheries literature to determine what is currently known about each fishery and where gaps lie. Preliminary results identified a limited body of relevant literature (33 studies) within two databases and while many papers acknowledged the fisheries, they did not elaborate upon them. When more information was given, it was not the focus of the study making it difficult to identify detailed knowledge about the fisheries. Moving forward, this study will further assess the literature using a framework by Anderson et al. (2015) focusing on ecological, economic, and community dimensions. Gaps identified may be used to inform managers of areas where fisheries could be improved to aid in invasive green crab population control.

Benjamin Fillier

Public Participation in Offshore Wind Development: A Global Analysis of Public Engagements and Consultations

As countries around the world become increasingly invested in offshore renewable energy developments, such as offshore wind farms (OWF), their legal requirements, policies and strategies must safeguard adequate systems of public participation in the decision-making process to ensure equitable outcomes. Public Participation is an instrumental factor in OWF projects, paving the way to success by gaining a social licence to operate and increasing public support, while also mitigating backlash and protest. The objective of this contribution, therefore, is to assess public participation measures in OWF regimes globally to then provide recommendations for Canada's offshore wind policy regime that is being spearheaded in the Nova Scotian context. The findings identified in this paper are the result of a created database that synthesizes selected countries' legal and voluntary documents for OWF development. Documents are analyzed by understanding where, when and how the public is involved in the process, their degree of influence, and what return/benefits are gained from development. What's identified is a difference between acceptance and participation-based measures. Legal requirements for OWF development around the world lean toward a public acceptance model, conditionally needing a high sense of approval for development to occur. Participatory measures are less apparent, with processes that include benefits being largely the voluntary responsibility of developers. A gradual drop-off point is identified from legally mandated acceptance measures to voluntary participatory ones, which serves as the key point through which this paper's findings are translated into recommendations for Canada's offshore wind development regulatory process.

POSTER SESSION
EXCEPTIONAL MARINE RESEARCH

Julie Gaal

Improvements to Canada's Marine Biosecurity and How They Can Be Applied to an Ecosystem-Based Management Approach

Nonindigenous species are species that have been introduced to areas outside of their native habitat, whether intentionally or unintentionally. Globalization and increases to activities such as aquaculture, shipping, fisheries, and the aquarium trade has led to an increased number of alien species introductions in recent decades. A small proportion of alien species will become invasive, meaning they reproduce and spread long distances from where they were first introduced. Invasive species can impact ecosystem services and processes, reduce biodiversity, and have negative impacts on local economies and livelihoods. Managing these species is one of the greatest challenges for conservation of biodiversity in terrestrial, freshwater, and marine habitats. Invasive species are the second most common cause of species extinctions, and their management is crucial to biodiversity conservation. While management strategies for invasive species have predominantly been developed for the terrestrial ecosystem, strategies in the marine environment are lacking. The high connectivity of this environment makes control of invasions even more challenging. This project utilized a systematic literature review to examine how aquatic invasive species are introduced to and move around Canada, what management regulations are in place, and how Canada's approach differs to other countries. Australia and New Zealand are considered world leaders in biosecurity, and the United States and Canada share a border. The biosecurity of these three countries were therefore compared to Canada's. Recommendations for how to improve Canada's biosecurity were made, specifically in the Maritimes, and how these management options fit into a broader ecosystem-based framework was discussed.

Jumanah Khan

Do You Sea What I See: Investigating the Representation of Place-based Knowledge in Spatial Planning

Spatial planning is essential in the interdisciplinary management of dynamic coastal environments. However, conventional approaches to spatial planning do not focus on the comprehensive representation and visual communication of place-based knowledge. This oversight limits the contextual applicability of planning decisions. To understand this issue's relevance in Nova Scotia, I will be investigating how data representation (DR) tools used in spatial planning account for and represent local perspectives. Through semi-structured interviews with spatial planners, researchers, and users of coastal environments in Nova Scotia, this research will amplify the perspectives and ways of knowing of rightsholders and stakeholders in the context of spatial planning in the province. Findings are meant to inform the use and design of DR tools in a way that better serves coastal users throughout different stages of the spatial planning process – thereby supporting decision-making that is informed, sustainable, and equitable.

POSTER SESSION
SHARING EXCEPTIONAL RESEARCH

Lyle Porter

Applying Socio-Ecological Systems Thinking to Canadian Impact Assessment

Considering recent amendments to Canada's Impact Assessment Act, it is now within the legislative jurisdiction of Regional Assessments (RA) to identify and consider potential positive and adverse effects on the environment, society, and economy of any potential offshore wind development activity within a regional study area. Despite these ambitions, RA practice has remains historically entrenched in isolating the factors of interest, rather than recognizing their intimate interdependency. Using socio-ecological system evaluation methods, I incorporate the potential impacts of offshore wind development on Nova Scotia lobster harvesting within the regional assessment framework, considering all relevant socio-ecological dimensions from lobster ecology to fishing practices to the cultural and social implications of windfarm development on lobster harvesters. This work will not elucidate project-specific impacts of offshore wind, but will rather identify methodological approaches at a regional planning level to (1) procedurally incorporate socio-ecological coupled systems thinking into impact assessment, and (2) identify methods to mitigate potential negative socio-ecological effects of offshore wind activity on regional lobster harvesting. Ultimately, this work looks to inform future impact assessment process whilst exemplifying the capacity to consider coupled socio-ecological systems within Canadian offshore RIAs.

Joy Rivers

Fisheries Management in Napu'saqnuk (St. Mary's) River and alignment with Atlantic Salmon (Salmo salar) conservation through an Ecologically Significant Area case study

An Ecologically Significant Area (ESA) is an area-based conservation tool established to provide long-term enhanced conservation and protection of key areas for fish and fish habitat that are highly productive, sensitive, rare, and/or unique. The intent of ESAs is not to regulate fishing but understanding fishing practices in proposed ESAs is important in determining whether fishing practices align with conversation and protection objectives. The St. Mary's River (SMR) is being considered for an ESA as it meets all three ecological criteria (i.e. highly productive, sensitive, rare, and/or unique). The SMR is home to Atlantic salmon which plays an important role in eastern Canada's environment, economy and culture. The objective of this research is to determine whether fisheries are in alignment with conservation objectives of the ESA case study. The focus is on Atlantic salmon and how fisheries do or do not impact their life cycle. To answer this question, a literature review is being conducted. Preliminary results suggest there are gaps in freshwater recreational fishing reporting, fishing may be a relatively low threat to Atlantic salmon in the watershed relative to other current and potential future threats, ESAs won't regulate fishing, but additional management measures should be explored to reduce bycatch.

POSTER SESSION
SHARING EXCEPTIONAL RESEARCH

Reid Sutherland

Multiaxial Shark Conservation: How vertical distribution can inform marine management

Canada currently manages sharks exclusively at the federal level. Strategies that the nation has adopted reflect what many other countries are implementing due to international shark governance treaties (i.e., ICATT regulations). Canada has banned finning in 1994, the import and export of shark products in 2019, and also prohibited all pelagic shark landings from the groundfish fleet—effectively abolishing the market for sharks in the country. Despite these efforts, largely guided by Canada's National Plan of Action for the Conservation and Management of Sharks (current to 2007), the COSEWIC status of several shark species found in Atlantic Canadian waters remains poor and have, in some cases, for almost two decades. The advent of satellite tagging technology within the past 20 years, however, has facilitated a new frontier of behavioural ecology in large pelagic fishes like sharks: vertical distribution and diving behaviours. Using data from PSAT tags which record light, depth, and temperature information, the largescale movements and depth/temperature preferences of several great white (Carcharodon charcharias), shortfin mako (Isurus oxyrinchus), and porbeagle (Lamna nasus) sharks will be modelled using R. Specifically, comparative satellite tag and temperature profiles, satellite map track plotting, and time at depth/time at temperature analyses across these three species will be interpreted relative to the literature. A better understanding of vertical habitat use may inform management options that can further reduce shark mortality by a) identifying and managing for useable seasonal habitat based on depth and temperature through time and b) mitigating the likelihood of capture in the first place.

Megan Shin

Using a freshwater climate risk index for biodiversity (FW-CRIB) framework to guide management in Eastern Canada

Climate change is occurring globally, impacting the distribution and fitness of organisms and the potential for ecosystems to provide vital services to human societies. In freshwater ecosystems across the globe, increasing variability and frequency of precipitation extremes, subsequent water flows, rising trends in water temperature, and more, are being observed. To effectively manage freshwater populations, policy measures must be implemented with climate projections in mind. An essential step in this process is to identify the species and ecosystems that are most vulnerable to climate change to support decision-making for conservation and restoration. The freshwater climate risk index for biodiversity (FW-CRIB) is composed of two parts: climate change vulnerability assessments (CCVA), and climate change risk assessments (CCRA). I applied the FW-CRIB to Nova Scotia, New Brunswick, and Prince Edward Island at the primary watershed level, assessing 14 species in total. The assessments looked at multiple indicators across three categories: sensitivity, the current and future environmental and ecological conditions facing a species in a given area; exposure, the stress on a species in a given area under three modelled climate scenarios (representative concentration pathways (RCP) 2.6, 4.5, and 8.5); and adaptive capacity, the ability of a species or area to adapt to changing conditions. I found the most vulnerable watershed at the ecosystem level was found to be the Saint John River Basin in New Brunswick, under RCP 8.5. At the species level, Atlantic salmon in the Saint John River Basin produced the highest vulnerability scores under RCP 8.5. High risk watersheds in New Brunswick indicate areas where focused conservation efforts are needed, while areas of high climate vulnerability present opportunities to monitor new and emergent ecosystems.

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