

Navigating the Operational & Permitting Requirements for Shipping in the Canadian Arctic A Visualization Tool

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Introduction

The PASSAGES Project

*Protection & Advanced Surveillance System for the Arctic:
Green, Efficient, Secure*

Purpose:

Improve monitoring and risk analysis of vessel traffic in the Canadian Arctic

Airbus Defence & Space, Fraunhofer FKIE, exactEarth Ltd., Dalhousie University

- Observations:
 - The regulations can be fragmented and confusing
 - The jurisdictions and authorities are not always clear
 - There is not an overview of the regulations and stakeholders
- Goal: Create a database of the stakeholders and legal aspects

The Databases

STAKEHOLDERS

Stakeholder Group	Stakeholders Included in Group	SCALE				INTERESTS			
		International	National	Local	Climate & Environment	Economics	Safety, Security & Defense	Health & Social	Multi-Specific Aspects
Aboriginal Affairs and Northern Development Canada (AANDC)	Canadian Polar Commission		X		X	X		X	X
Adventure tourists	Arctic Contaminants Action Program (ACAP)	X		X			X		
	Arctic Monitoring & Assessment Programs (AMAP)								
Arctic Council	Conservation of Arctic Flora and Fauna (CAFF)				X	X	X	X	X
	Coastal Council	X							
	Emergency, Prevention, Preparedness and Response (EPPRR)								
Banks/Insurance market	Protection of the Arctic Marine Environment (PAME)								
	Sustainable Development Working Group (SDWG)								
Canadian Northern Economic Development Agency (CanNor)	Coastal Forum								
	Layers		X	X	X	X	X		
Classification societies	P&IDeals	X	X	X		X		X	
	American Bureau of Shipping								
Cruise industry	Bureau Veritas								
	ClassNK								
	DNV GL	X	X	X	X	X	X		
	Korean Register								
	U.S. Coast Guard								
Domestic shipping industry	International Maritime Organization (IMO)								
	Association of Arctic Expedition Cruise Operators (AECO)		X	X	X	X	X		X
Environment Canada (EC)	Ship owners, operators and crew								
	Ship insurers, operators and crew								
Fisheries & Oceans Canada (DFO)	Coastal Forum		X		X	X	X		
	Chartering companies		X		X	X	X		
Foreign Affairs, Trade and Development (FATD)	Shipbuilders								
	Canadian Coast Guard (CCG)	X	X	X	X	X	X	X	X
Ice Navigators	Canadian Coast Guard (CCG)	X	X	X	X	X	X	X	X
	Canadian Hydrographic Service (CHS)	X	X	X	X	X	X	X	X
International Maritime Organization (IMO)	Maritime Environment Protection Committee (MEPC)	X			X		X		
	Maritime Safety Committee (MSC)	X			X		X		
International shipping industry	Ship owners, operators and crew								
	Coastal Forum	X	X		X	X	X		
Inuit commercial fisheries	Shipbuilders								
	Classification societies				X	X	X	X	X
Mining industry	Classification societies				X	X	X	X	X
	Communication	X	X		X	X	X	X	X
National Defence (DND)	Canadian Forces	X	X		X	X	X	X	X
	Defence Research and Development Canada (DRDC)								
Natural Resources Canada (NRCan)	Joint Resource Coordination Centre (JRCC)	X	X	X			X		X
	Joint Task Force North (JTFN)								
Non-governmental organizations (NGOs)	National Search and Rescue Institute (NSRI)								
	Geological Survey of Canada		X		X	X			
Non-fruit commercial fisheries	Greenpeace								
	International Commission for the Conservation of Atlantic Tunas (ICCAT)	X	X	X	X	X	X	X	X
Oil & Gas industry	International Commission for the Conservation of Atlantic Tunas (ICCAT)	X	X	X	X	X	X	X	X
	Greenpeace								
Public Safety Canada (PSC)	World Wildlife Fund (WWF)	X	X	X	X	X	X	X	X
	Canadian Border Service Agency (CBSA)								
Research community	Canadian Security Intelligence Service (CSIS)		X	X	X	X	X		
	Royal Canadian Mounted Police (RCMP)								
Territorial Governments	Centre of Excellence	X	X	X	X	X	X	X	X
	Research Institutes								
Transport Canada (TC)	Government of Nunavut			X	X	X	X	X	X
	Government of Yukon								

LEGAL ASPECTS

Stakeholder Group	Stakeholders Included in Group	Scale	Interests
Aboriginal Affairs and Northern Development Canada (AANDC)	Canadian Polar Commission	International	Climate & Environment, Economics, Health & Social, Multi-Specific Aspects
	Arctic Contaminants Action Program (ACAP)	National	Health & Social, Multi-Specific Aspects
Adventure tourists	Arctic Monitoring & Assessment Programs (AMAP)	National	Health & Social, Multi-Specific Aspects
	Conservation of Arctic Flora and Fauna (CAFF)	National	Health & Social, Multi-Specific Aspects
	Coastal Council	National	Health & Social, Multi-Specific Aspects
Arctic Council	Emergency, Prevention, Preparedness and Response (EPPRR)	National	Health & Social, Multi-Specific Aspects
	Protection of the Arctic Marine Environment (PAME)	National	Health & Social, Multi-Specific Aspects
	Sustainable Development Working Group (SDWG)	National	Health & Social, Multi-Specific Aspects
Banks/Insurance market	Coastal Forum	National	Health & Social, Multi-Specific Aspects
	Layers	National	Health & Social, Multi-Specific Aspects
Canadian Northern Economic Development Agency (CanNor)	P&IDeals	National	Health & Social, Multi-Specific Aspects
	American Bureau of Shipping	National	Health & Social, Multi-Specific Aspects
Classification societies	Bureau Veritas	National	Health & Social, Multi-Specific Aspects
	ClassNK	National	Health & Social, Multi-Specific Aspects
	DNV GL	National	Health & Social, Multi-Specific Aspects
	Korean Register	National	Health & Social, Multi-Specific Aspects
	U.S. Coast Guard	National	Health & Social, Multi-Specific Aspects
Cruise industry	International Maritime Organization (IMO)	National	Health & Social, Multi-Specific Aspects
	Association of Arctic Expedition Cruise Operators (AECO)	National	Health & Social, Multi-Specific Aspects
Domestic shipping industry	Ship owners, operators and crew	National	Health & Social, Multi-Specific Aspects
	Ship insurers, operators and crew	National	Health & Social, Multi-Specific Aspects
Environment Canada (EC)	Coastal Forum	National	Health & Social, Multi-Specific Aspects
	Chartering companies	National	Health & Social, Multi-Specific Aspects
Fisheries & Oceans Canada (DFO)	Shipbuilders	National	Health & Social, Multi-Specific Aspects
	Canadian Coast Guard (CCG)	National	Health & Social, Multi-Specific Aspects
Foreign Affairs, Trade and Development (FATD)	Canadian Coast Guard (CCG)	National	Health & Social, Multi-Specific Aspects
	Canadian Hydrographic Service (CHS)	National	Health & Social, Multi-Specific Aspects
International Maritime Organization (IMO)	Maritime Environment Protection Committee (MEPC)	National	Health & Social, Multi-Specific Aspects
	Maritime Safety Committee (MSC)	National	Health & Social, Multi-Specific Aspects
International shipping industry	Ship owners, operators and crew	National	Health & Social, Multi-Specific Aspects
	Coastal Forum	National	Health & Social, Multi-Specific Aspects
Inuit commercial fisheries	Shipbuilders	National	Health & Social, Multi-Specific Aspects
	Classification societies	National	Health & Social, Multi-Specific Aspects
Mining industry	Communication	National	Health & Social, Multi-Specific Aspects
	Canadian Forces	National	Health & Social, Multi-Specific Aspects
National Defence (DND)	Defence Research and Development Canada (DRDC)	National	Health & Social, Multi-Specific Aspects
	Joint Resource Coordination Centre (JRCC)	National	Health & Social, Multi-Specific Aspects
Natural Resources Canada (NRCan)	Joint Task Force North (JTFN)	National	Health & Social, Multi-Specific Aspects
	National Search and Rescue Institute (NSRI)	National	Health & Social, Multi-Specific Aspects
Non-governmental organizations (NGOs)	Geological Survey of Canada	National	Health & Social, Multi-Specific Aspects
	Greenpeace	National	Health & Social, Multi-Specific Aspects
Non-fruit commercial fisheries	International Commission for the Conservation of Atlantic Tunas (ICCAT)	National	Health & Social, Multi-Specific Aspects
	World Wildlife Fund (WWF)	National	Health & Social, Multi-Specific Aspects
Oil & Gas industry	International Commission for the Conservation of Atlantic Tunas (ICCAT)	National	Health & Social, Multi-Specific Aspects
	Greenpeace	National	Health & Social, Multi-Specific Aspects
Public Safety Canada (PSC)	World Wildlife Fund (WWF)	National	Health & Social, Multi-Specific Aspects
	Canadian Border Service Agency (CBSA)	National	Health & Social, Multi-Specific Aspects
Research community	Canadian Security Intelligence Service (CSIS)	National	Health & Social, Multi-Specific Aspects
	Royal Canadian Mounted Police (RCMP)	National	Health & Social, Multi-Specific Aspects
Territorial Governments	Centre of Excellence	National	Health & Social, Multi-Specific Aspects
	Research Institutes	National	Health & Social, Multi-Specific Aspects
Transport Canada (TC)	Government of Nunavut	National	Health & Social, Multi-Specific Aspects
	Government of Yukon	National	Health & Social, Multi-Specific Aspects

The Databases

STAKEHOLDERS

Stakeholder Group	Stakeholders Included in Group	SCALE				INTERESTS			
		International	National	Local	Climate & Environment	Economics	Safety, Security & Defense	Health & Social	Issue Specific Aspects
Aboriginal Affairs and Northern Development Canada (AANDC)	Canadian Polar Commission		X		X	X		X	X
Adventure tourists	Arctic Conservation Action Program (ACAP)	X		X			X		
	Arctic Monitoring & Assessment Programs (AMAP)								
	Conservation of Arctic Flora and Fauna (CAFF)								
Arctic Council	Conservation Council	X			X	X	X	X	X
	Emergency, Prevention, Preparedness and Response (EPPRR)								
	Protection of the Arctic Marine Environment (PAME)								
	Sustainable Development Working Group (SDWG)								
Banks/Insurance market	CoastalWatch		X	X	X	X	X		
	P&G-Quin		X	X	X	X	X		
Canadian Northern Economic Development Agency (CanNor)	American Bureau of Shipping	X	X	X		X		X	
	Kurweh, Wilkie								
Classification societies	Classiq	X	X	X	X	X	X		
	DNV GL								
	Korean Register								

LEGAL ASPECTS

Stakeholder Group	Stakeholders Included in Group	International	National	Local	Climate & Environment	Economics	Safety, Security & Defense	Health & Social	Issue Specific Aspects
Aboriginal Affairs and Northern Development Canada (AANDC)	Canadian Polar Commission		X		X	X		X	X
Adventure tourists	Arctic Conservation Action Program (ACAP)	X		X			X		
Arctic Council	Conservation Council	X			X	X	X	X	X
Banks/Insurance market	CoastalWatch		X	X	X	X	X		
Canadian Northern Economic Development Agency (CanNor)	American Bureau of Shipping	X	X	X		X		X	
Classification societies	Classiq	X	X	X	X	X	X		
	DNV GL								
	Korean Register								

Goal: Create user-friendly tools

Stakeholder Group	Stakeholders Included in Group	International	National	Local	Climate & Environment	Economics	Safety, Security & Defense	Health & Social	Issue Specific Aspects
International Maritime Organization (IMO)	Maritime Environment Protection Committee (MEPC)	X			X		X		
International shipping industry	Maritime Safety Committee (MSC)								
	Shipowners, charterers and crew	X	X		X	X	X		
	Shipbuilders								
Inuit commercial fisheries	Classification societies			X	X	X	X	X	X
	Communication			X	X	X	X	X	X
Mining industry	Canadian Register	X	X		X	X	X	X	X
	Defence Research and Development Canada (DRDC)								
National Defence (DND)	Joint Rescue Coordination Centre (JRCC)	X	X	X			X		X
	Joint Task Force North (JTFC)								
Natural Resources Canada (NRCan)	National Search and Rescue Institute (NSRI)				X	X			
	Geological Survey of Canada		X						
Non-governmental organizations (NGOs)	Greenpeace								
	Global Conservation Council (GCC)	X	X	X	X	X	X	X	X
	Inuit Tapscott & King-Inuit (ITKI)								
	Greenpeace North								
Non-inuit commercial fisheries	World Wildlife Fund (WWF)	X	X	X	X	X	X		
Non-inuit population				X	X	X	X	X	
Oil & Gas industry		X	X	X	X	X	X	X	
Parks Canada Agency			X	X	X		X	X	
Public Safety Canada (PSC)	Canadian Border Service Agency (CBSA)		X	X	X		X		
	Canadian Security Intelligence Service (CSIS)								
Research community	Royal Canadian Mounted Police (RCMP)								
	Centre of Excellence	X	X	X	X	X	X	X	X
	National Research Council of Canada								
Territorial Governments	Research Institutes								
	Northwest Territories			X	X	X	X	X	X
	Nunavut			X	X	X	X	X	X
Transport Canada (TC)	Public								
	Canadian Marine Advisory Council		X		X	X	X		

Stakeholder Group	Stakeholders Included in Group	International	National	Local	Climate & Environment	Economics	Safety, Security & Defense	Health & Social	Issue Specific Aspects
International Maritime Organization (IMO)	Maritime Environment Protection Committee (MEPC)	X			X		X		
International shipping industry	Shipowners, charterers and crew	X	X		X	X	X		
Inuit commercial fisheries	Classification societies			X	X	X	X	X	X
Mining industry	Canadian Register	X	X		X	X	X	X	X
National Defence (DND)	Joint Rescue Coordination Centre (JRCC)	X	X	X			X		X
Natural Resources Canada (NRCan)	National Search and Rescue Institute (NSRI)				X	X			
Non-governmental organizations (NGOs)	Greenpeace								
Non-governmental organizations (NGOs)	Global Conservation Council (GCC)	X	X	X	X	X	X	X	X
Non-inuit commercial fisheries	World Wildlife Fund (WWF)	X	X	X	X	X	X		
Non-inuit population				X	X	X	X	X	X
Oil & Gas industry		X	X	X	X	X	X	X	X
Parks Canada Agency			X	X	X		X	X	X
Public Safety Canada (PSC)	Canadian Border Service Agency (CBSA)		X	X	X		X		
Public Safety Canada (PSC)	Canadian Security Intelligence Service (CSIS)								
Research community	Royal Canadian Mounted Police (RCMP)								
Research community	Centre of Excellence	X	X	X	X	X	X	X	X
Research community	National Research Council of Canada								
Territorial Governments	Research Institutes								
Territorial Governments	Northwest Territories			X	X	X	X	X	X
Territorial Governments	Nunavut			X	X	X	X	X	X
Transport Canada (TC)	Public								
Transport Canada (TC)	Canadian Marine Advisory Council		X		X	X	X		

The Visualization Tools

Platform: d3.js

passages.ie.dal.ca/Arctic_Legal_Framework.html

passages.ie.dal.ca/Stakeholders_Wheel.html

A Specialized Tool

Canadian Marine Advisory Council - Prairie & Northern Region Meeting
May 2015, Iqaluit NU

- Observations:
 - Communication between and knowledge of other stakeholders is not ideal
 - No single open-access pool of information on the stakeholders, interactions, and legal aspects
- Goal: Produce an open-access visualization tool that is interactive and user-friendly
- Methods:
 - Advance the stakeholder database
 - Develop a visualization tool

The Visualization Tool for Navigating Domestic Shipping in the Canadian Arctic

passages.ie.dal.ca/Stakeholders_analysis.html

Applications

- Industry:
 - Facilitate in-house training
 - Best practices within the industry
- Public:
 - Knowledge mobilization
- Research applications:
 - Framework for working with other industries (e.g., cruise)
 - Comparisons / best practices shared between industries
 - Opportunity for collaboration and crowd-sourcing
- Governance:
 - Create and strengthen interactions

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Links

PASSAGES website:

<http://passages.ie.dal.ca>

Legal aspects visualization tool:

<https://jsfiddle.net/xhxe97vh/51/embedded/result/>

Stakeholder visualization tool:

http://passages.ie.dal.ca/Stakeholders_Wheel.html

Specialized visualization tool:

http://passages.ie.dal.ca/Stakeholders_analysis.html

Stakeholder database:

http://passages.ie.dal.ca/Appendix/Appendix_1.pdf

FEEDBACK WELCOMED