

Marine traffic risk management in the North

Ron Pelot, Mélanie Fournier, Laurent Etienne, Mark Stoddard,
Leah Beveridge

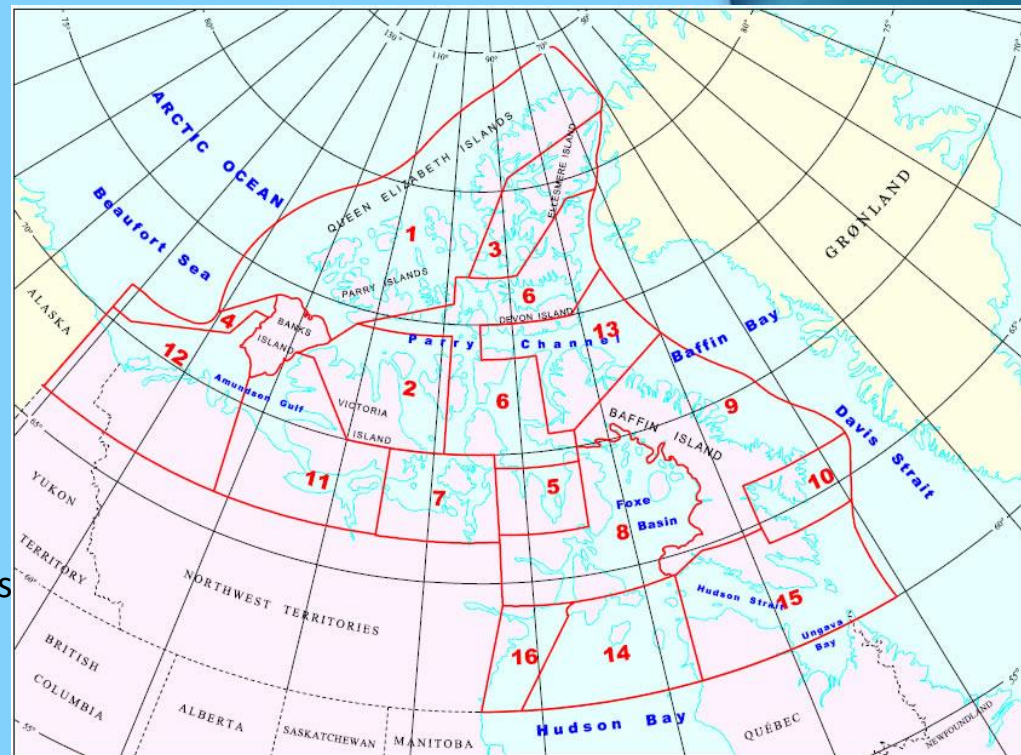


What do we mean by **Marine Traffic** ?

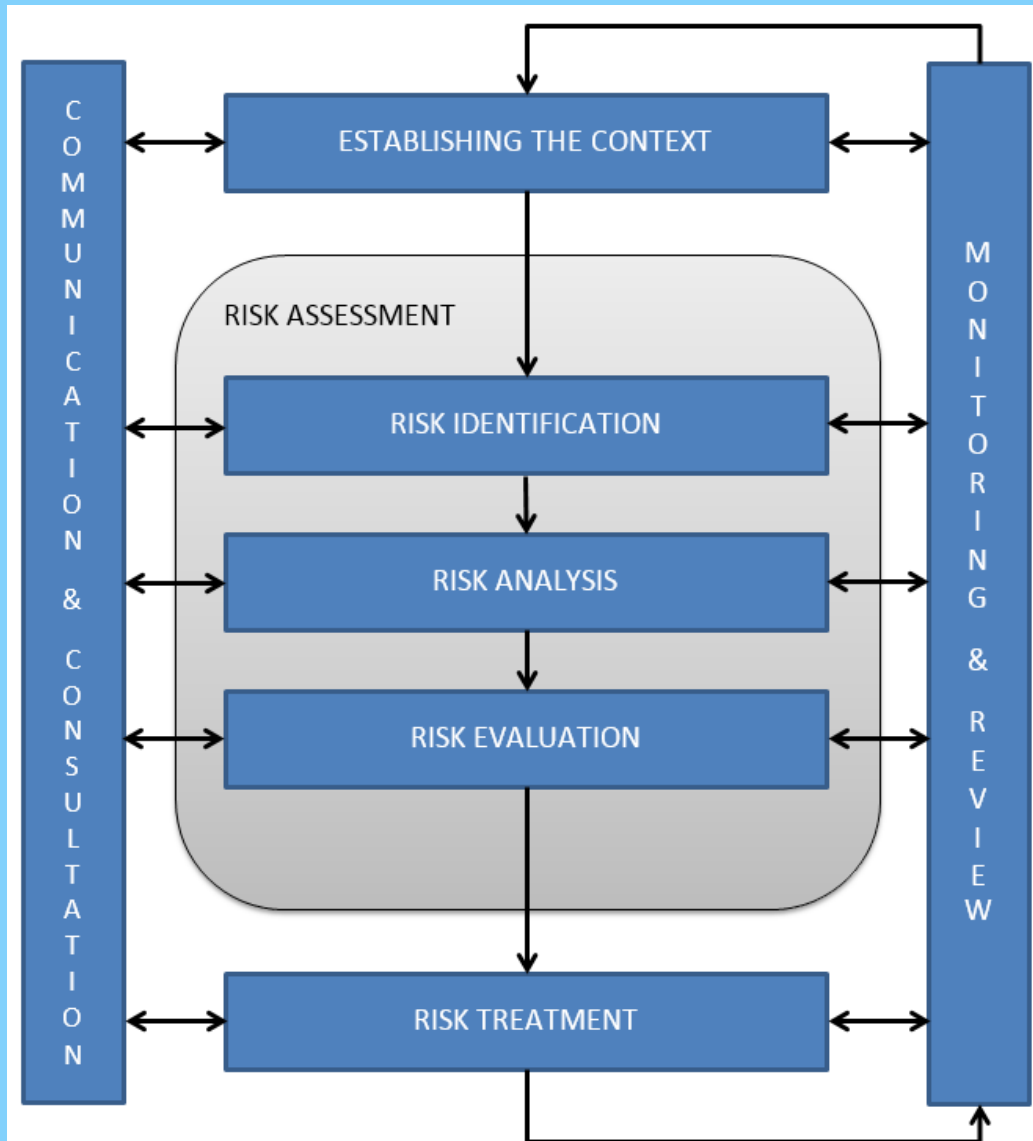
- Many types of vessels on the water
 - Ships
 - Fishing vessels
 - Recreational vessels
 - Ferries
 - etc.
- Many studies focus on larger ships, typically SOLAS class vessels
 - International Maritime Organization: Convention for the Safety of Life at Sea
 - International voyaging ships with gross tonnage (GT) of 300 or more, and all passenger ships.
- This traffic can be monitored (increasingly well) using AIS
 - Automatic Identification System
 - Mandated transponders on ships
 - Receivers on: other ships; land; satellite

What do we mean by **North** ?

- Many aspects of shipping are common worldwide
- However, specific issues in the North
 - Ice
 - Harsh weather
 - Freezing spray
 - Bathymetry quality
 - Remoteness (from assistance)
 - Communications limitations
 - Experience of crew
 - etc.
- Arctic Circle: above $66^{\circ} 33'N$
- Transport Canada
 - Zone/date system
 - AIRSS : Arctic Ice Regime Shipping Sys
- Russia: Northern Sea Route
- Baltic Sea



What do we mean by Risk Management ?



Source: ISO 31000 - Risk management

Purpose of Risk Management ?

- Risks to ships
 - Damage: grounding; collisions; ice damage
 - Risks to life, property, environment
 - Slowing down / preventing flow of goods
 - etc.
- Risks from ships
 - Pollution: air, water, shoreline
 - Noise
 - Ballast water / invasive species
 - Whale strikes
 - Coastal security
 - etc.
- Application
 - Operations: navigation; route planning; search & rescue; etc.
 - Prevention: regulations; training; vessel design; vessel monitoring; MPAs; etc.
 - Response: SAR resource allocation; DND; Critical infrastructure; etc.

Why model **Marine Traffic** ?

- Big data issues
- Prioritize risks (exposure types and levels)
- Comparison between areas
- Identification of significant risk factors
- Anomaly detection
 - Vessel in trouble
 - Illegal activity
 - Risky behaviour
 - etc.
- Trends
- Forecasting
- etc.

Sponsors / partners for my work

- PASSAGES project
 - Protection and Advanced Surveillance System for the Arctic:
Green, Efficient, Secure
- NSERC - Collaborative Research and Development Grants
- exactEarth Ltd.
- AIRBUS Defence and Space (Germany)
- Fraunhofer Institute – FKIE (Germany)

Thank you

- Dalhousie PASSAGES Research Team
 - Ron Pelot
 - Melanie Fournier
 - Mark Stoddard
 - Leah Beveridge
 - Laurent Etienne

QUESTIONS ?