OTN: Telemetry and Data Infrastructure in Support of Global Researchers

MASTS Elasmobranchs, 5 Sept 2014

Fred Whoriskey
Executive Director
www.oceantrackingnetwork.org

OTN's Premise

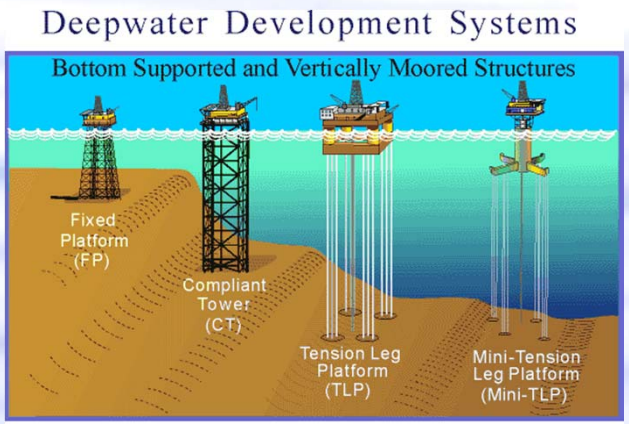
- Aquatic species are critically important to humans
- Many move; in four dimensions; sometimes over great distances; need to "map" these distributions
- Conservation & sustainable management of aquatic resources can only be achieved through integrated monitoring of the animals and their environment
- Requires collaborative and globally-linked research initiatives.

OCEAN TRACKING NETWORK

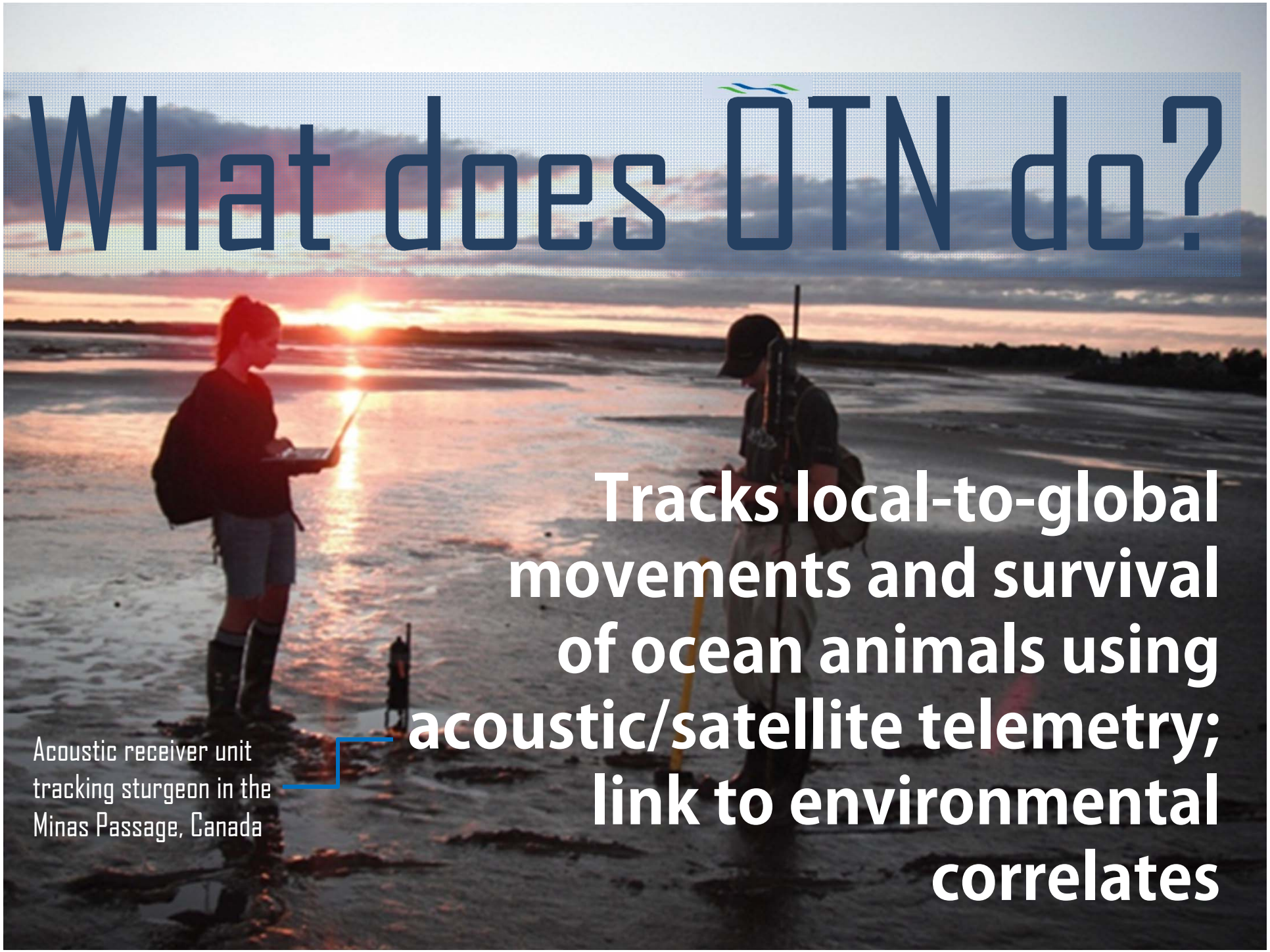
Human Use of the Marine Environment is Changing Rapidly…

- Growing human dependence
- New economic uses

Coastal Megacities



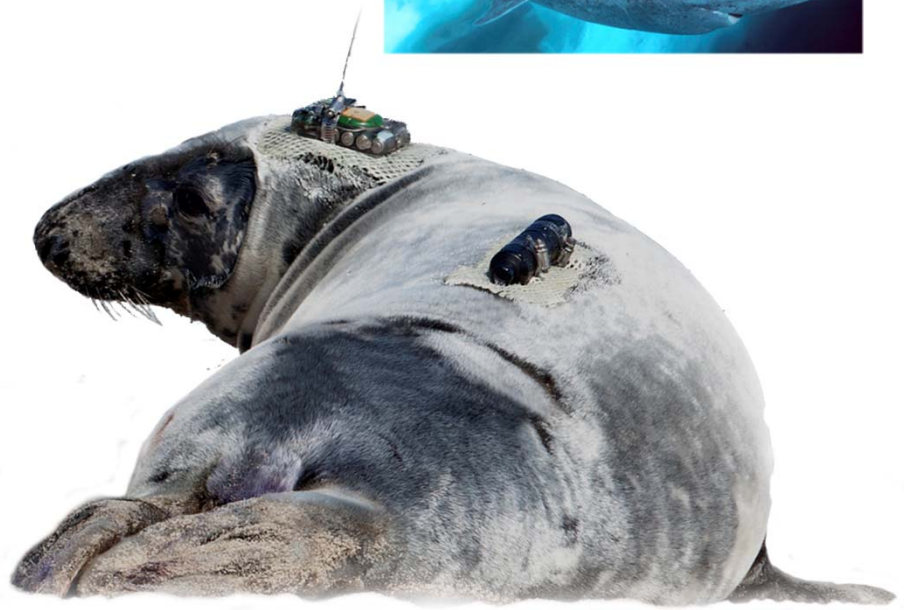
What does OTN do?



Tracks local-to-global movements and survival of ocean animals using acoustic/satellite telemetry; link to environmental correlates

Acoustic receiver unit tracking sturgeon in the Minas Passage, Canada

What does OTN track?



OCEAN TRACKING NETWORK

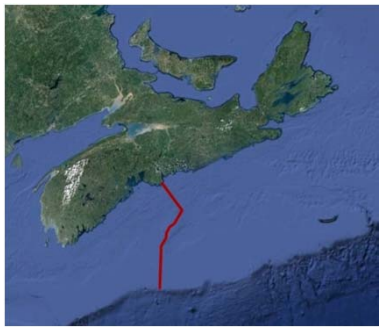
DALHOUSIE UNIVERSITY *Inspiring Minds*

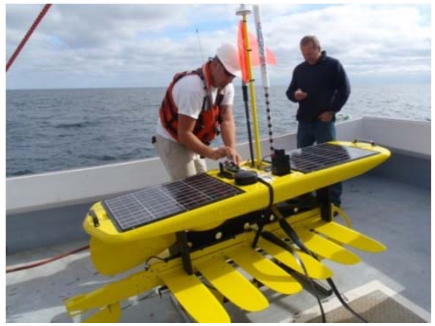
OTN – A Canadian Global Telemetry Initiative

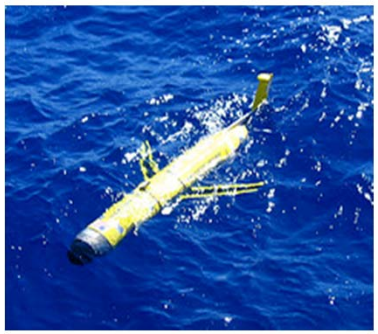
- CFI $35M IJVF (international) platform
- $10M NSERC science network
- Built on Canadian acoustic technology
- Flows from Census of Marine Life

OTN infrastructure

- Tags, acoustic receivers (fixed, mobile, agile); autonomous vehicles & bioprobes (telemetry and oceanography)
- Strategic placements globally enhancing existing capabilities
- New technology/approaches



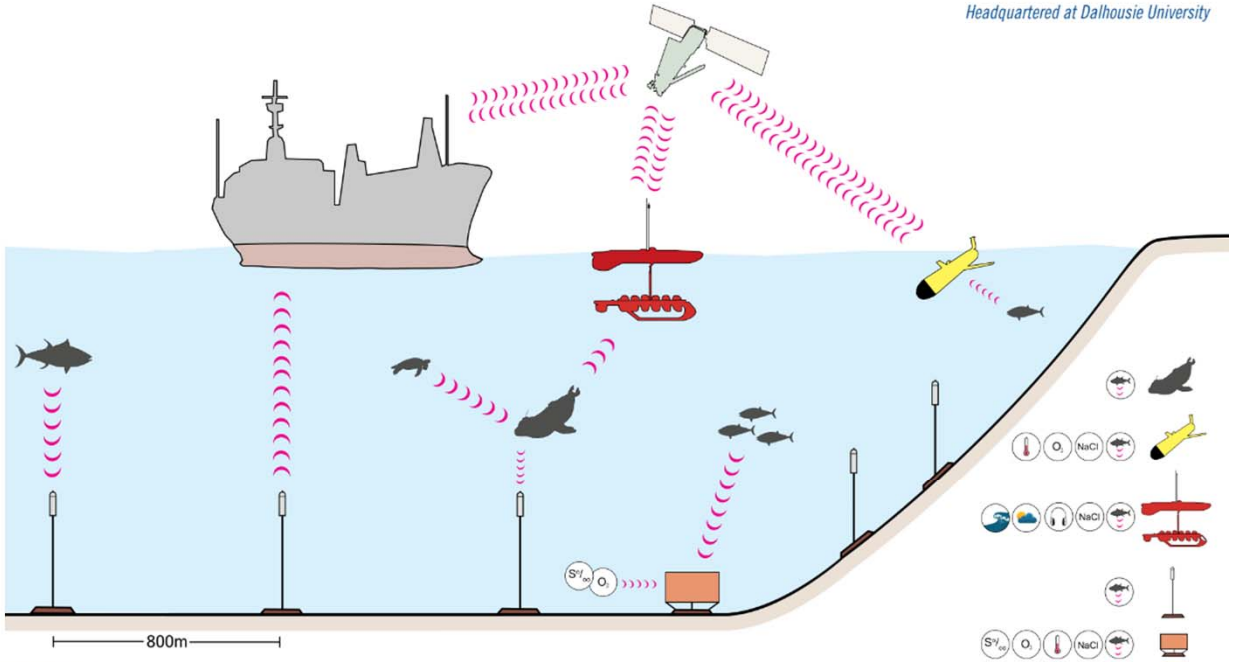




OCEAN TRACKING NETWORK

DALHOUSIE UNIVERSITY
Inspiring Minds

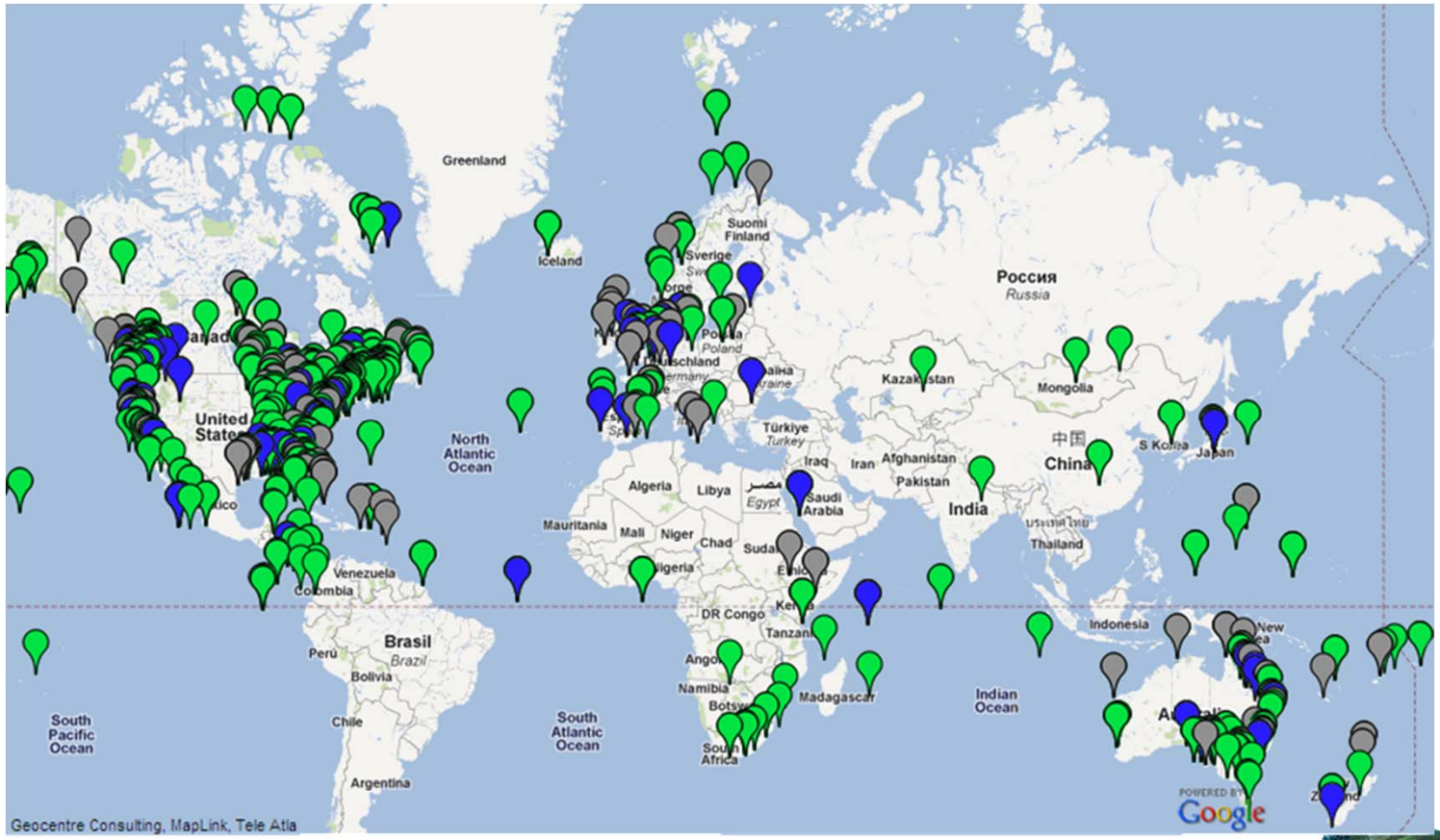
OTN technology



OCEAN TRACKING NETWORK

DALHOUSIE UNIVERSITY
Inspiring Minds

OTN – The Global Potential

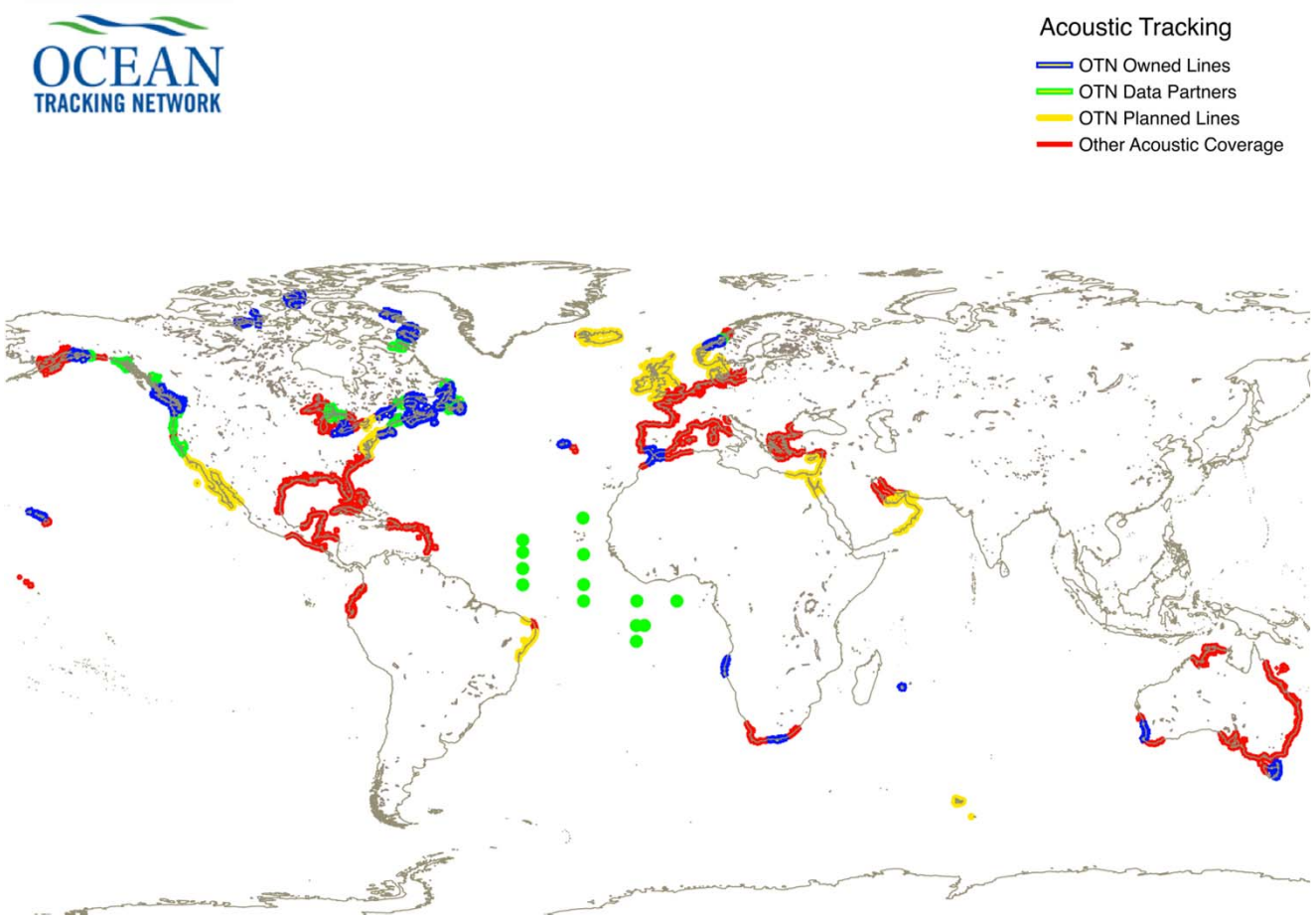


OTN: Built on partnerships

- Meet regional science needs
- Existing networks (IMOS-AATAMS; USIOOS-ATN)
- Universities, industry, government, NGO's
- Deployment, tagging and data collaborators
- Open access; $128 M

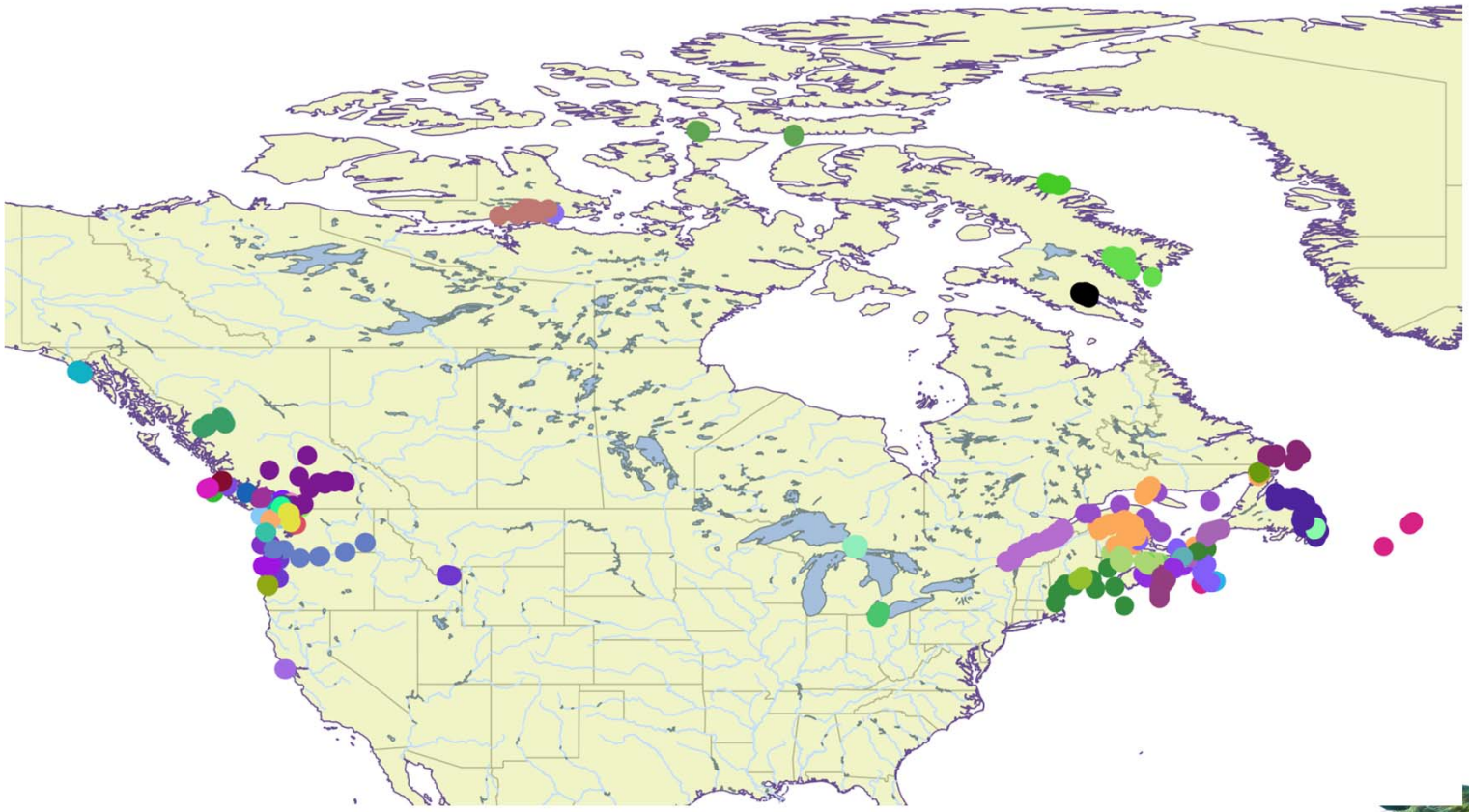
IOC
WMO
UNEP
ICSU
GOOS
GLOBAL OCEAN OBSERVING SYSTEM
www.ioc-goos.org
The oceans are the basis of the life support system. GOOS measures ocean warming and provides an opportunity for the human system to respond.
glynnAgorick.co.uk

Global acoustic receiver coverage



OCEAN TRACKING NETWORK

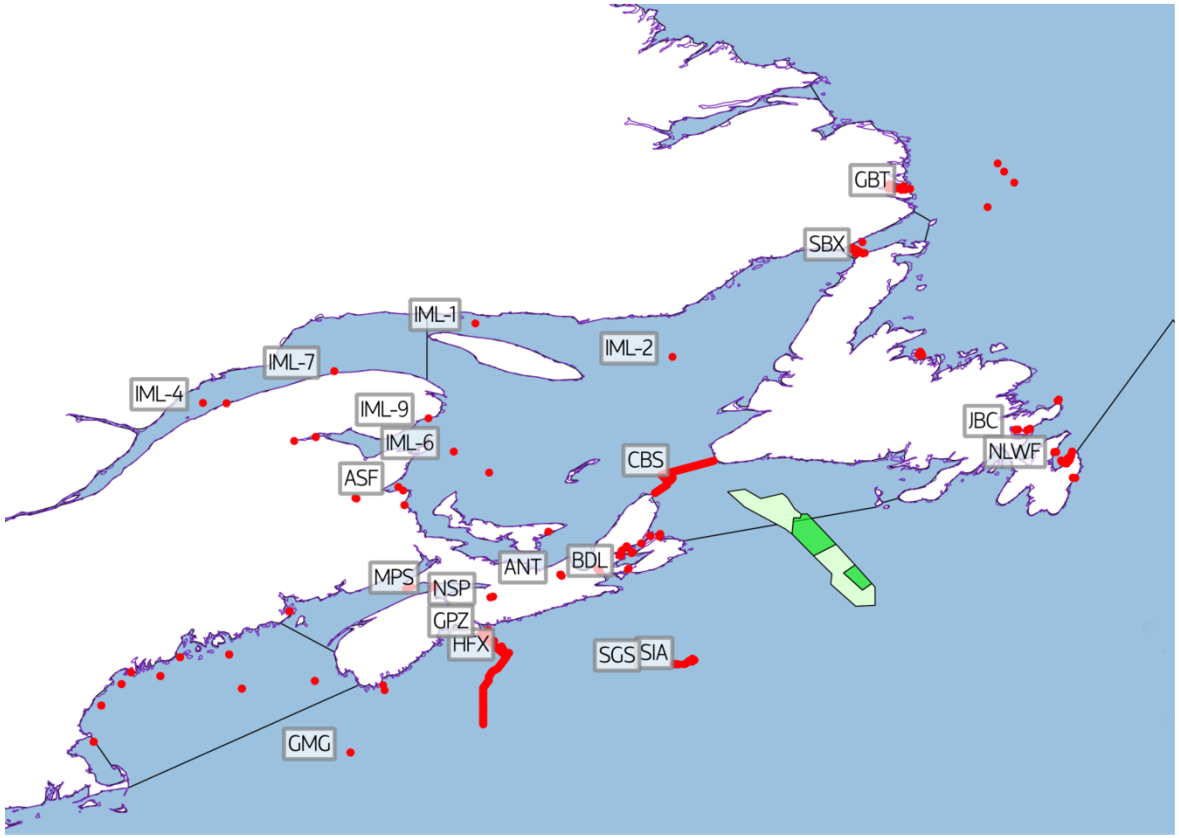
North American Deployments (as of 2014)

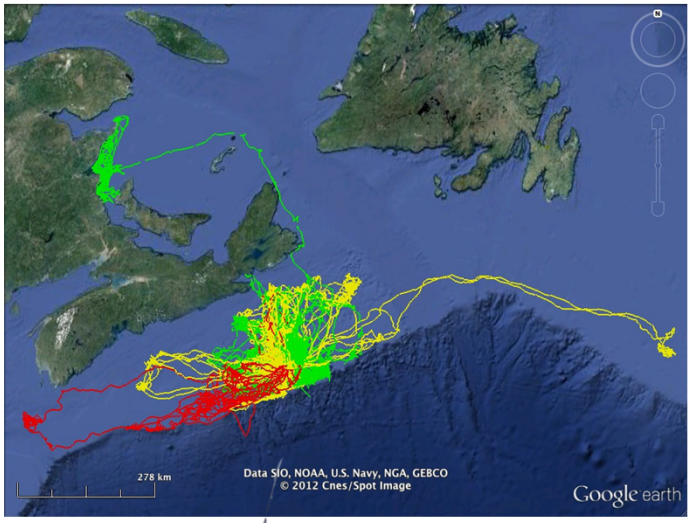


OCEAN TRACKING NETWORK

DALHOUSIE UNIVERSITY
Inspiring Minds

St Lawrence/Scotian Shelf/GoM OTN network

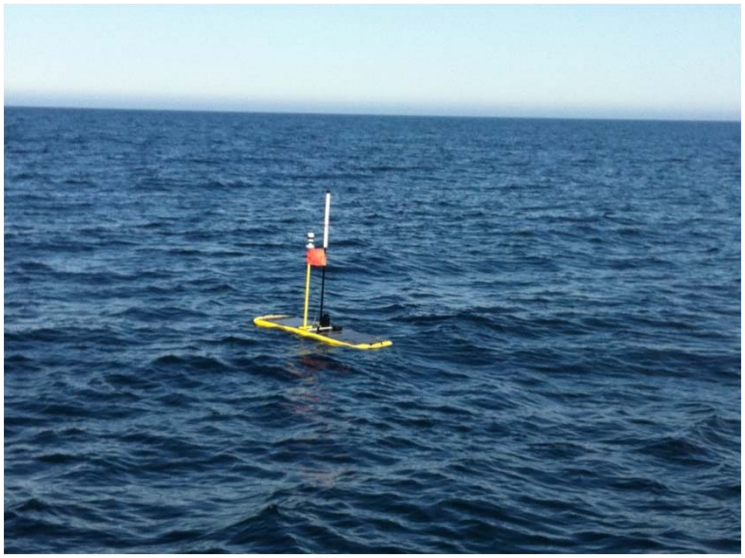


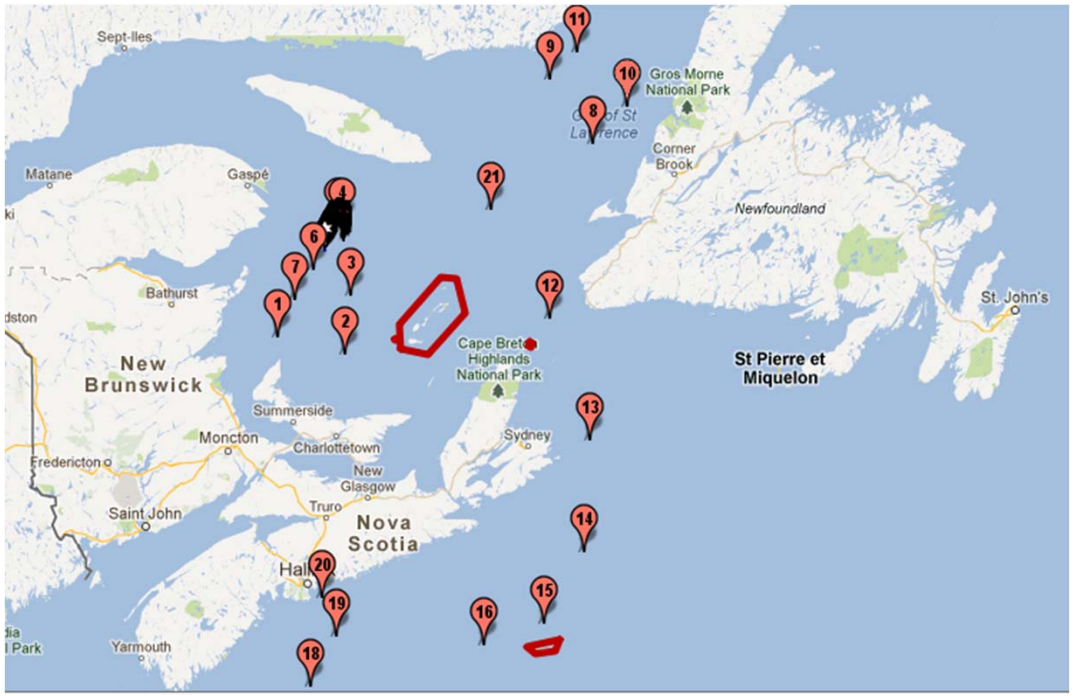


OCEAN TRACKING NETWORK

DALHOUSIE UNIVERSITY
Inspiring Minds

http://gliders.oceantrack.org/





OCEAN TRACKING NETWORK

GLIDERPALOOZA 2013

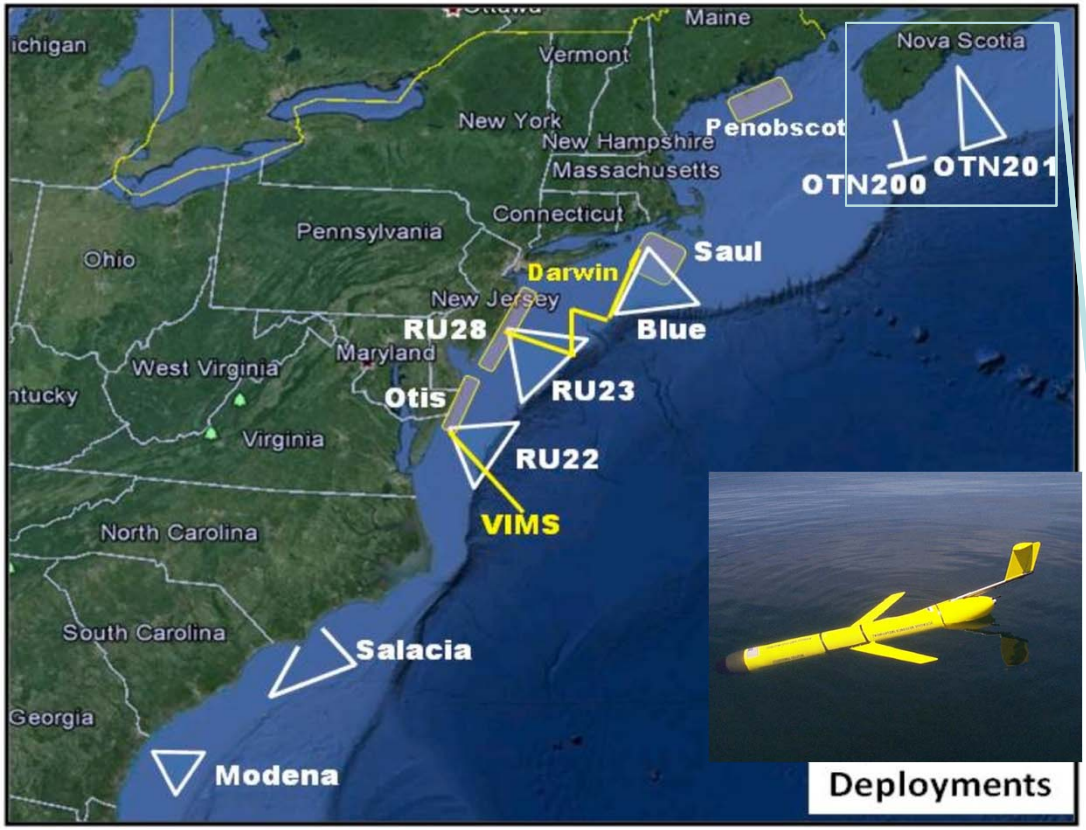
Work hard. Have fun. Change the world. -Doug Webb

OCEAN TRACKING NETWORK

When: Sep-Oct 2013
Where: From Nova Scotia (Halifax) south to Georgia

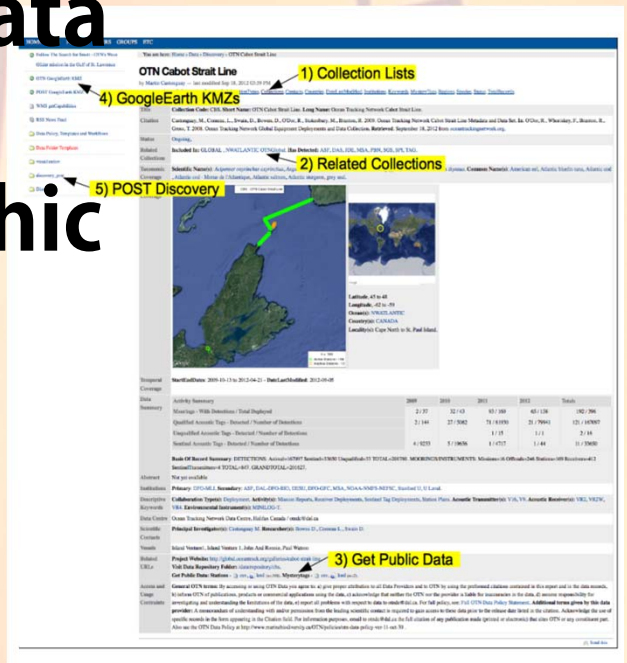
What: 13-16 Slocum Gliders simultaneously deployed with receivers and a well sampled ocean by satellites, CODAR, moorings to support an ensemble of ocean models

Who :
Funding: MARACOOS, EPA, UDel, NA SA, ONR,
OTN, Private, Maine, VIMS, Skidaway, SECOOR
Participants/operators: OTN/Dalhousie , UMaine, WHOI, UMass, Rutgers, UDel, UMaryland, VIMS, NCState, Ski daway, Teledyne Webb



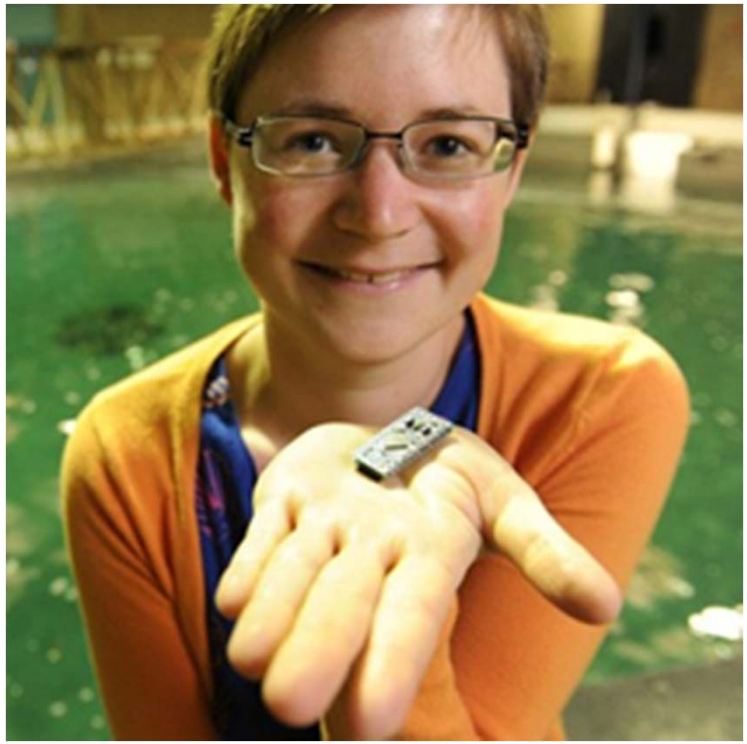
Data warehousing

- >90 million detection records, historic and current (open access data standards)
- Analyzed with oceanographic records (T, O2, Salinity, etc.)
- Experienced data storage and analysis team; HQP
- Links to AATAMS, ATN



Industry links

- Spin-offs: Maritimebiologgers, Baker Blue Ocean
- Aquaculture (Catalina Sea Ranch; Mussel Farms)
- Deployments: Encana, StatOil, Mobil
- Local suppliers through the supply chain



OCEAN TRACKING NETWORK

DALHOUSIE UNIVERSITY Inspiring Minds

Challenges

- Europe (Horizon 2020); expansion to new geographic areas, with limited history of telemetry
- Increasing receiver coverage in existing areas
- Renewing Canadian commitment
- Addressing all the questions that can be addressed

INNOVATION.CA
CANADA FOUNDATION FOR INNOVATION | FONDATION CANADIENNE POUR L'INNOVATION

NSERC CRSNG

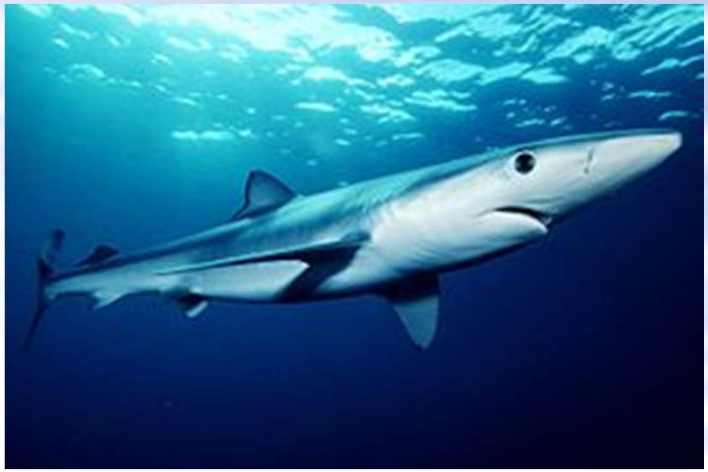
DALHOUSIE UNIVERSITY Inspiring Minds

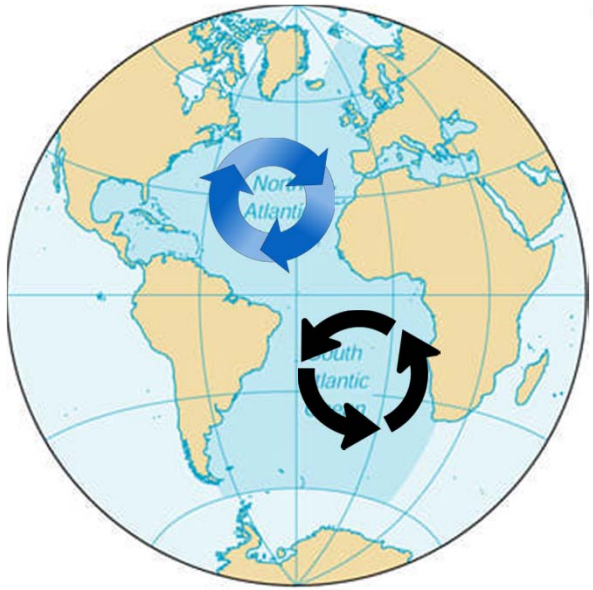
Social Sciences and Humanities Research Council of Canada | Conseil de recherches en sciences humaines du Canada

Canada

Blue sharks (*Prionace glauca*)

- World's most abundant and cosmopolitan large shark
- Segregation by size and sex
- Atlantic Ocean: Proposed migratory loop
- Biased due to fisheries based tag-release-recapture studies?
- Need for longer-term, site-specific studies





Blue shark telemetry objectives

- Document habitat use of NS immature female blue sharks
- Build receiver partnerships
- Provide data to support offshore development
- Student training

OCEAN TRACKING NETWORK

DALHOUSIE UNIVERSITY
Inspiring Minds

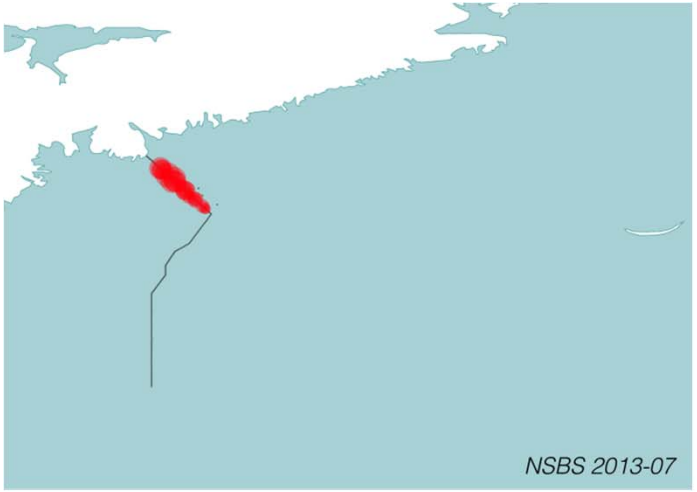
Preliminary results from 2013 tagging

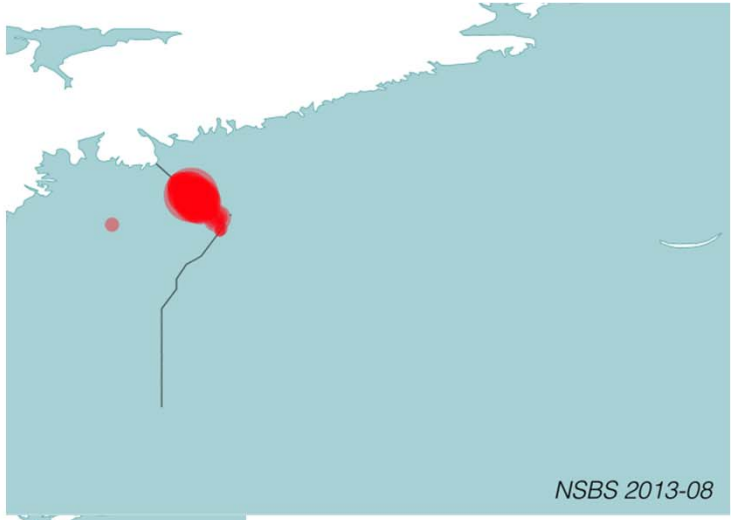
- 20 immature females angled, tagged, released
- All subsequently detected by receivers
- 1 animal to Sable Island; sharks offshore of Halifax until Jan 2014

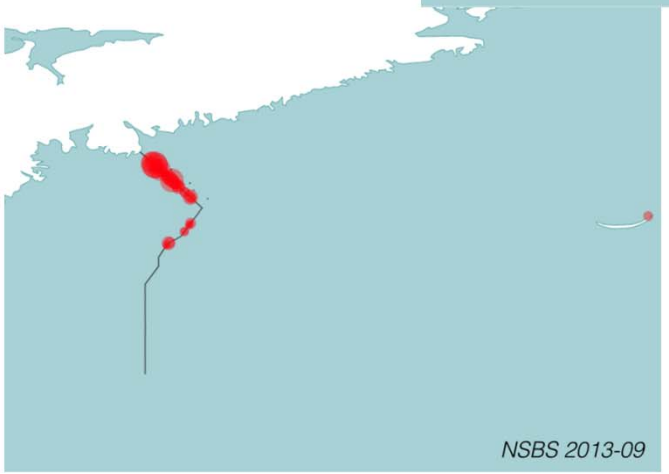
OCEAN TRACKING NETWORK

DALHOUSIE UNIVERSITY
Inspiring Minds

Monthly detections of blue sharks

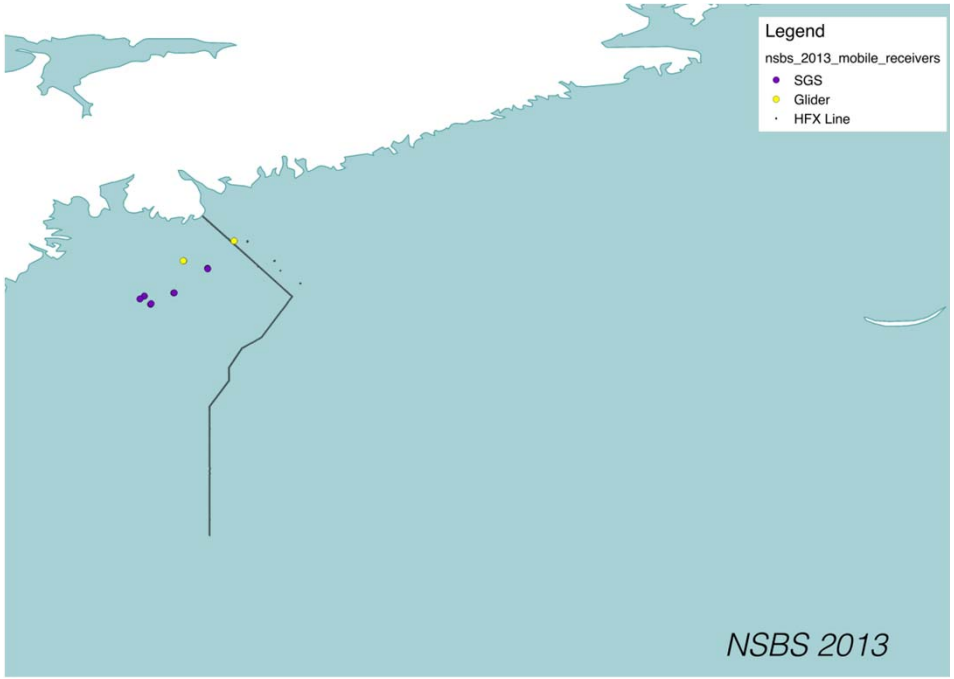






Bioprobe and Glider detections

- One seal encountered 5 different sharks SW of Halifax
- Gliders also encountered 2 sharks in the same region
- Sharks again in coastal region

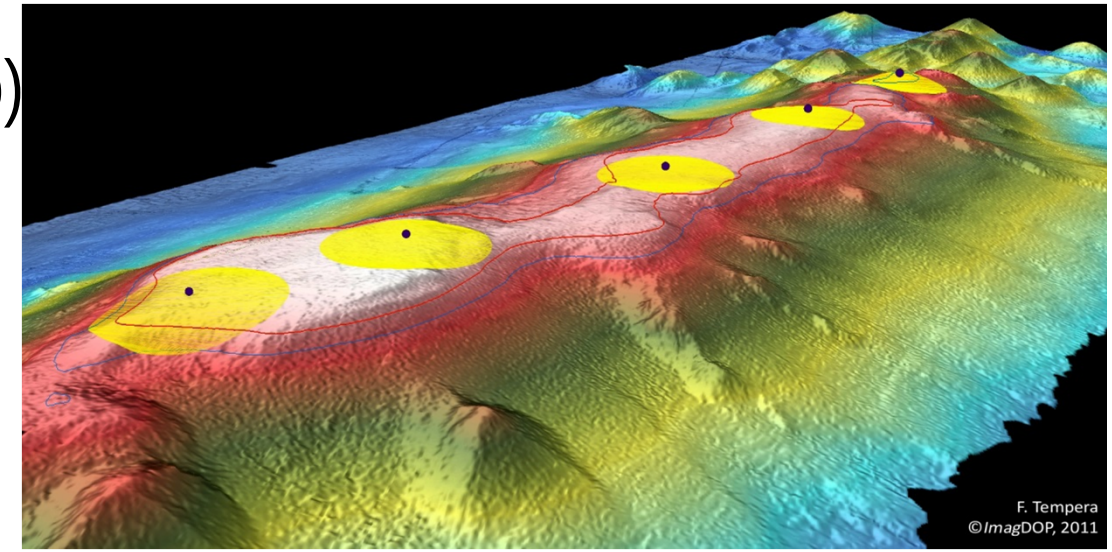


OTN Elasmobranch (shark) researchers

- Developing North East Atlantic shark tracking network
- Australia
- South Africa/IO
- Hawaii
- Tropical Atlantic
- Brazil

Current European Activities

- European Telemetry Network component to Atlantos H 2020 submission (P. Afonso)
- Deployments
  - Trondheim fjord
  - Azores
  - Ireland
- NPP submission re salmonid aquaculture
- ERIF Tidal Power interest



INNOVATION.CA
CANADA FOUNDATION FOR INNOVATION | FONDATION CANADIENNE POUR L'INNOVATION

NSERC CRSNG

Social Sciences and Humanities Research Council of Canada | Conseil de recherches en sciences humaines du Canada

Canada

DALHOUSIE UNIVERSITY
Inspiring Minds

OCEAN TRACKING NETWORK

Fred Whoriskey, OTN Executive Director

Ocean Tracking Network
Dalhousie University
Halifax, Nova Scotia Canada

fwhoriskey@dal.ca
1 (902) 494-4095

www.oceantrackingnetwork.org
Twitter @OceanTracking