Understanding our Islands: How to get the best out of our GIS and data

Turks and Caicos Islands GIS and data Training Workshop

3rd February 2015

What marine scientific research data do other organisations hold within TCI waters?

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Why now?

UK White Paper on OT recognises importance of OT and encourages collaboration and to provide tech support

UK OT Biodiversity Strategy - Strategic priorities for UK Government action;
v. developing ecosystem-based initiatives for the conservation and sustainable use of the marine environment.

Joint Ministerial Council Communiqué 2014 – Six areas of priorities identified;
Prosperity, Security, Environment, Governance, Communities & international

UN Convention on Biological Diversity (CBD) target of 10% of marine area to be MPA

From Joint Ministerial Council 2013 - Progress on Implementation of Agreed Actions Completed By Montserrat Date: 27th November 2014.

The Fisheries Unit of the Ministry of Agriculture is **seeking adequate technical** and financial assistance from HMG to develop the required legal framework for **improving the long-term sustainable management, governance and development of the marine resource** in Montserrat waters under national jurisdiction.

During a UKOT Biodiversity Strategy Review Meeting, held at KEW, March 2013, OT government participants expressed a **desire for broader based contacts with UK Government experts**, particularly within DEFRA and its family of agencies. **Specific issues in need to be addressed** related to current or anticipated **marine conservation and/or management actions** were identified at this time and through subsequent consultation with OT and Crown Dependencies governments. **Technical assistance, capacity building, resources, and an improved network with UK expertise were identified as critical** components for progress in careful planning and implementation of necessary conservation actions.

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Why?

Bathymetry data is recognised as being of considerable value, not only to organisations such as Hydrographic Offices, who require the highest possible quality data for producing charts, but increasingly bathymetry data from a variety of sources with varying degrees of quality are being recognised as providing the foundation upon which States can deliver sustainable marine management plans.

The theme for the IHO's World Hydrography Day 2014 was *Hydrography – much more than just nautical charts*

Where the IHO recognise the value of bathymetry data to enable the blue economy

Sources of data:

Hydrographic charting by HO/Navy
Industry surveys e.g. cable and pipeline routing, windfarm, hydrocarbon survey companies
Academia e.g. marine scientific research
etc
etc

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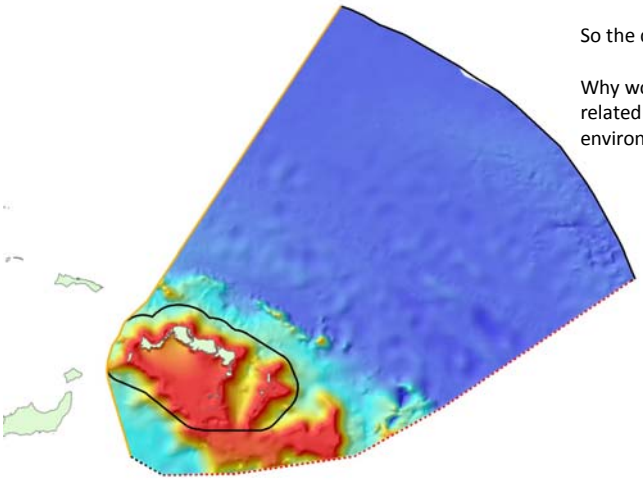
Why?

TCI marine area is 157 times larger than land area



So the question is

Why wouldn't issues related to the marine environment to addressed

Land area 950 sq km vs marine area 149,550 sq km

Land 950 sq km
TS 16,550 sq km
EEZ 133,000 sq km

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What for?

Resource potential	Disaster mitigation	Environmental benefits
Tourism	Tsunami*	Marine biodiversity
Minerals	Volcano	MPAs
Fisheries	Ship grounding	Governance/MSP
Mega-Yacht moorings	Navigation	
Infrastructure	Environment	
Cable routes (comms)	SOLAS	

* magnitude 2.8 earthquake offshore BVI 15-10-13

"The United Kingdom's Overseas Territories play host to some of our most precious environmental assets, many of which would be irreplaceable if lost.

Richard Benyon Minister for the Natural Environment and Fisheries, Department for Environment, Food and Rural Affairs (2010-2013)

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How?

The United Nations Convention on the Law of the Sea (UNCLOS) is the overarching treaty for the marine environment

Within the UNCLOS there are provisions that provide measures by which States;

- define their marine area e.g. maritime boundaries
- recognise their responsibilities and obligations e.g. to protect and preserve
- **outlines the rights they have within their marine area e.g. access to scientific data and promote capacity building**

Example articles:

article 246(2) - Marine scientific research in the exclusive economic zone and on the continental shelf **shall be conducted with the consent of the coastal State**

article 249(1a) - ensure the right of the coastal State [..] **to participate or be represented in the marine scientific research project**, especially on board research vessel [..]

article 249(1c) - [..] **provide access for the coastal State**, at its request, **to all data and samples** derived from the marine scientific research project [..]

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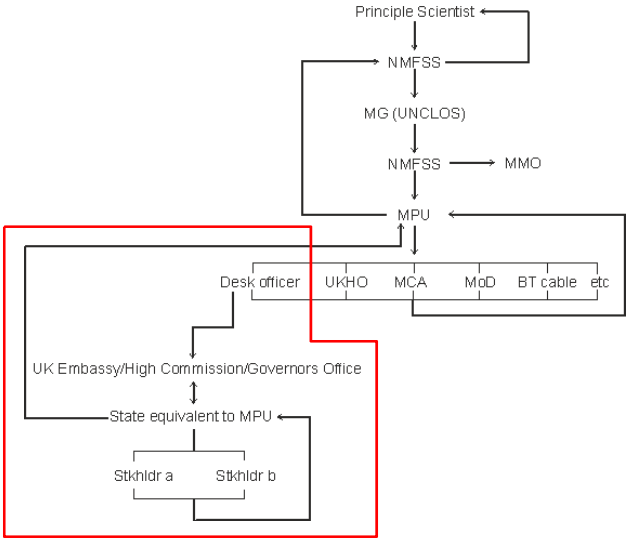
How?

Diplomatic clearance process for NERC(NOC) managed ships



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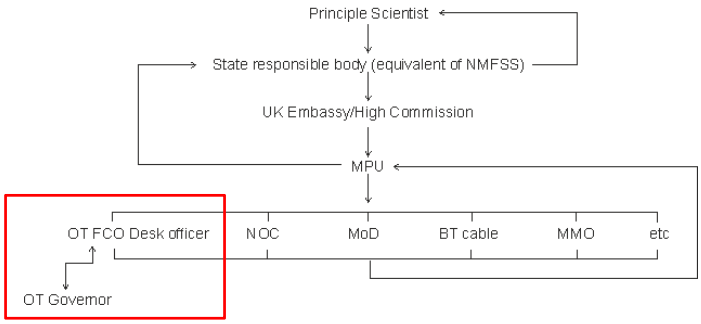
How?

Diplomatic clearance by foreign vessel to work in UK waters



Need to improve diplomatic clearance process to ensure data become available

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Where are the data?

Local database(s)

National database(s) with global coverage

Regional Institutions

International Institutions

Universities

Hydrographic Offices

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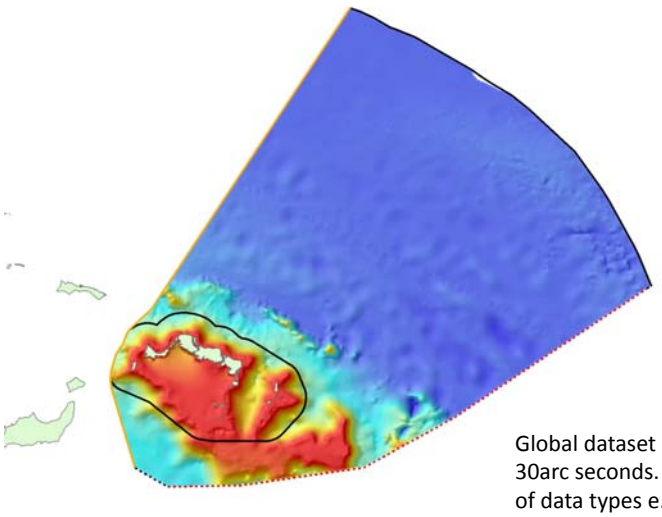
What data are available?



GEBCO

Global dataset with resolution of 30arc seconds. Composed of a variety of data types e.g. satellite derived gravity data, singlebeam bathymetry and multibeam bathymetry.

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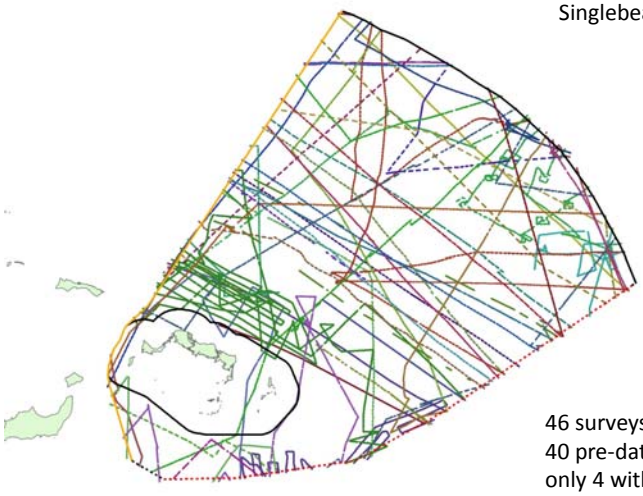
What data are available?

Singlebeam bathymetry



46 surveys
40 pre-date 1980
only 4 with GPS navigation

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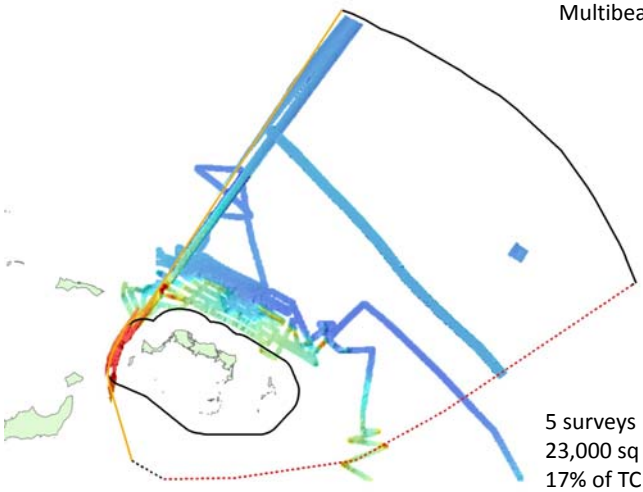
What data are available?

Multibeam bathymetry



5 surveys
23,000 sq km coverage
17% of TCI marine area
~$250,000 (excl mob)

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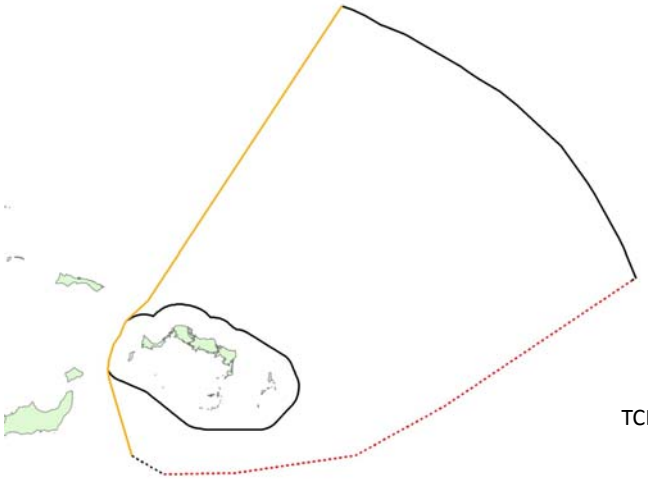
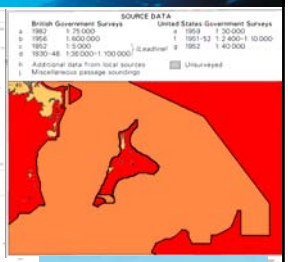
What data are available?



TCI data?

What data are available?

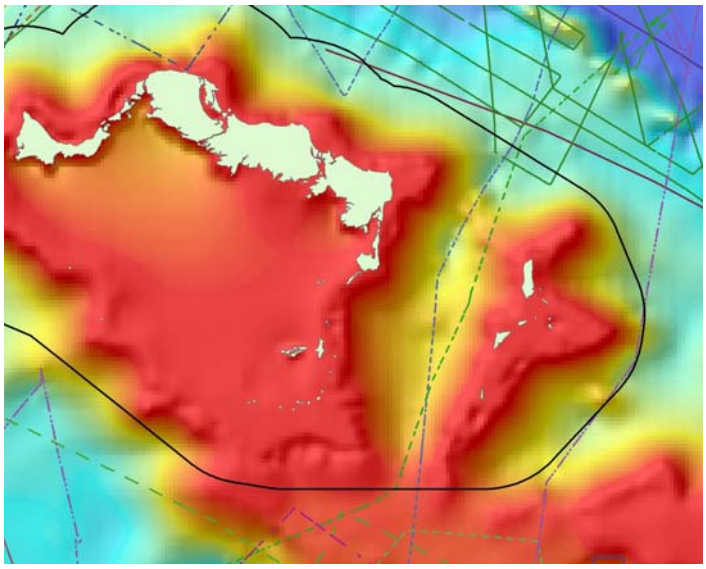
Amber = 1937 – 66 surveys – covering deeper water
Red = 1830-52 leadline – mainly in areas of shoaler water where the main berths are



Main berths and Cruise activity

GB 1450 Turks and Caicos

(courtesy of the UKHO)



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Application in GIS?

Data assembly

Metadata information

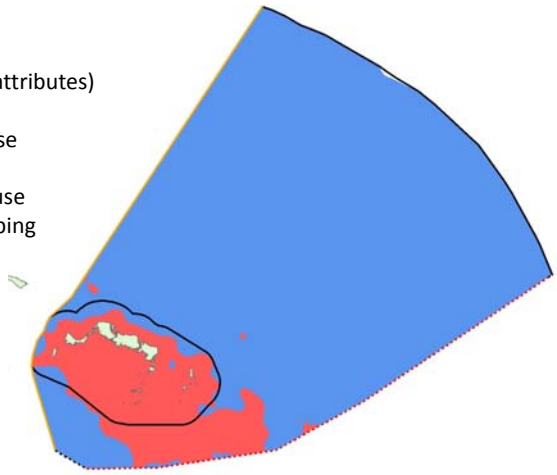
Derivative information (create attributes)

Visualisation of marine space use

Management of marine space use (fisheries areas, dive sites, shipping lanes etc)

Research

Marine Spatial Planning tool
(as part of a broader framework)



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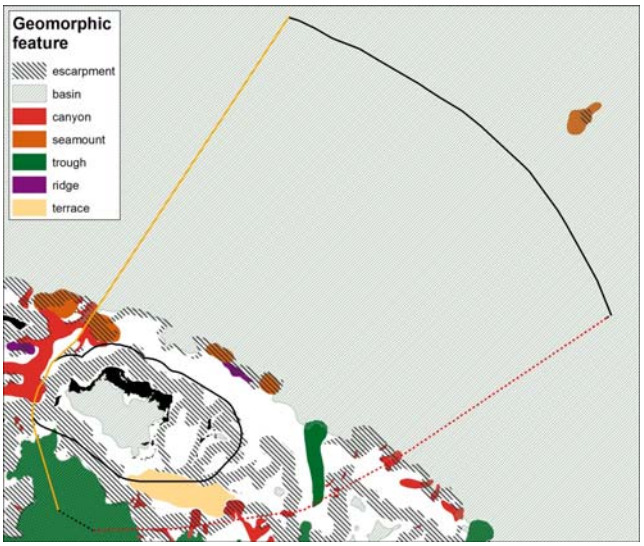
Application in GIS?



Harris, P.T., Macmillan-Lawler, M., Rupp, J., Baker, E.K., 2014. Geomorphology of the oceans. Marine Geology 352, 4-24

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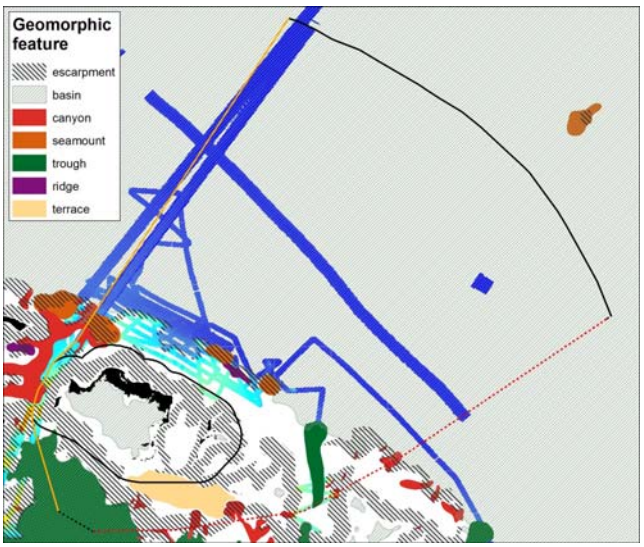

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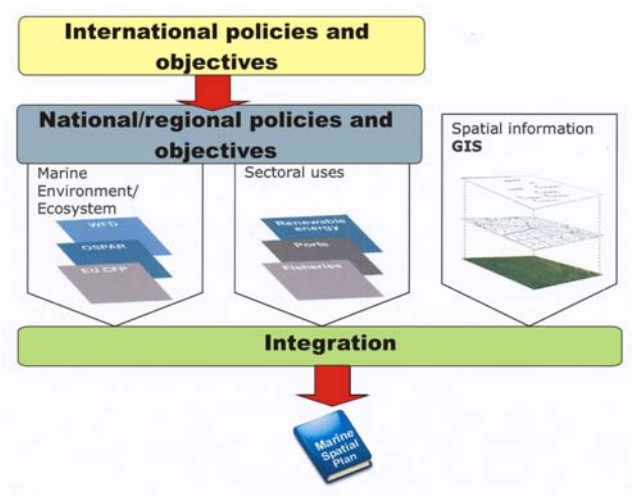

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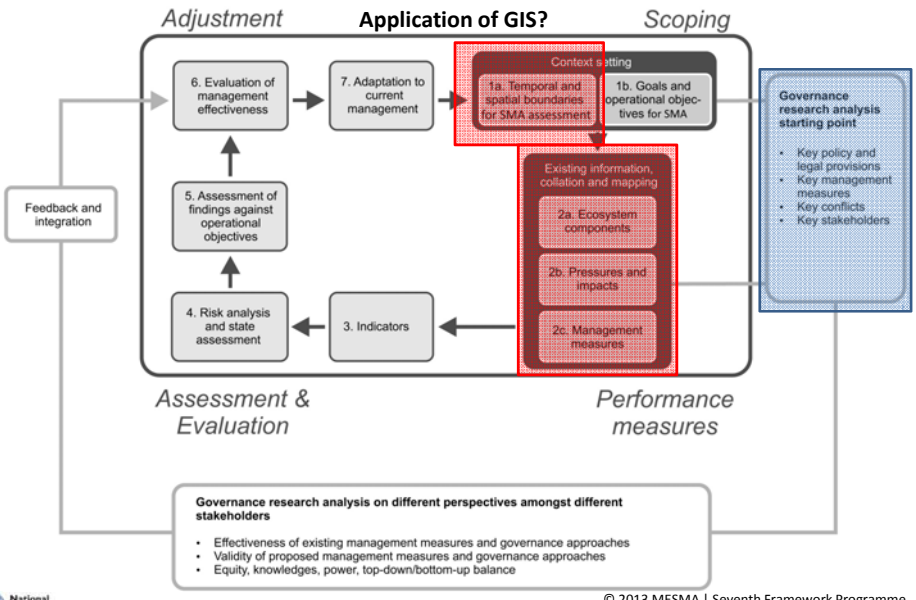
Application of GIS?



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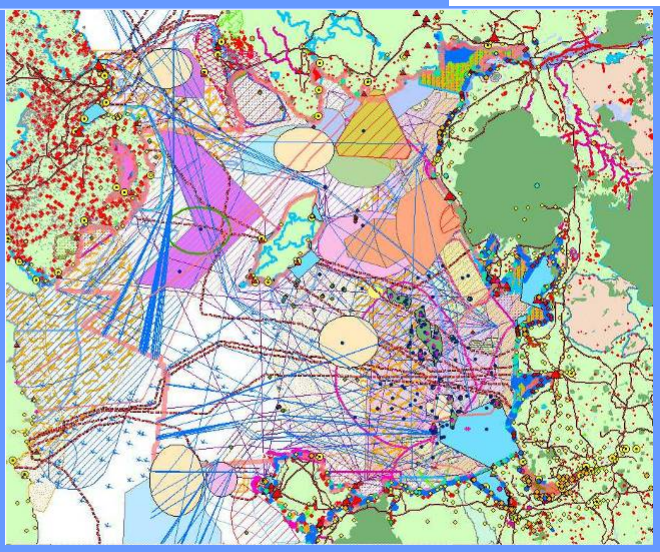
Competing use

defra Department for Environment Food and Rural Affairs

- Landuse
- Tourism
- Oil &Gas
- Mariculture
- Coastal Defence
- Ports & Navigation
- Military Activities
- Culture
- Conservation
- Dredging & Disposal
- Submarine Cables



- Fishing
- Renewable Energy
- Marine Recreation
- Mineral Extraction

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Benefits

- Identify where data exists, no need for re-surveying as such saving significant costs (survey once, use many times)
- Identify gaps in data coverage – targeted approach to addressing shortfall
- access to data for use in scientific research and ocean governance e.g. Resources, Tourism, fisheries, Environment, disaster mitigation
- Cost benefit analysis of mapping programme(s) known to be in the order of 1:>4

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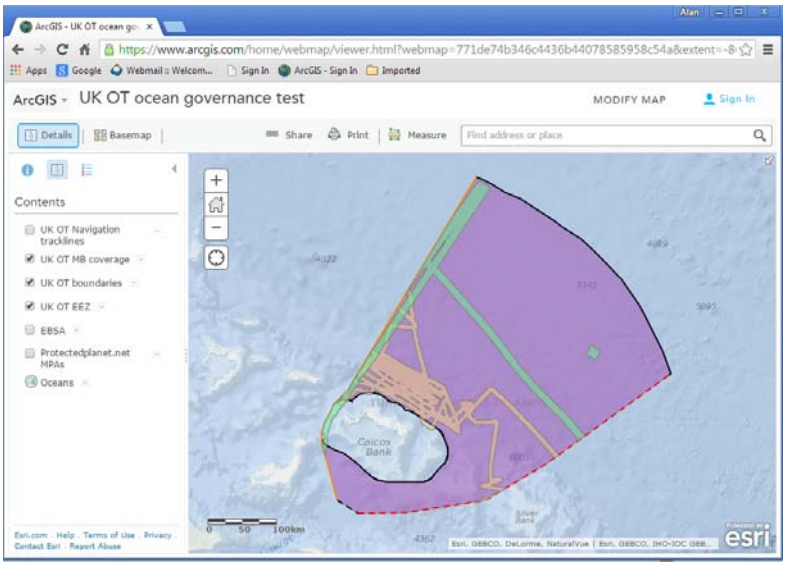
Data dissemination



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