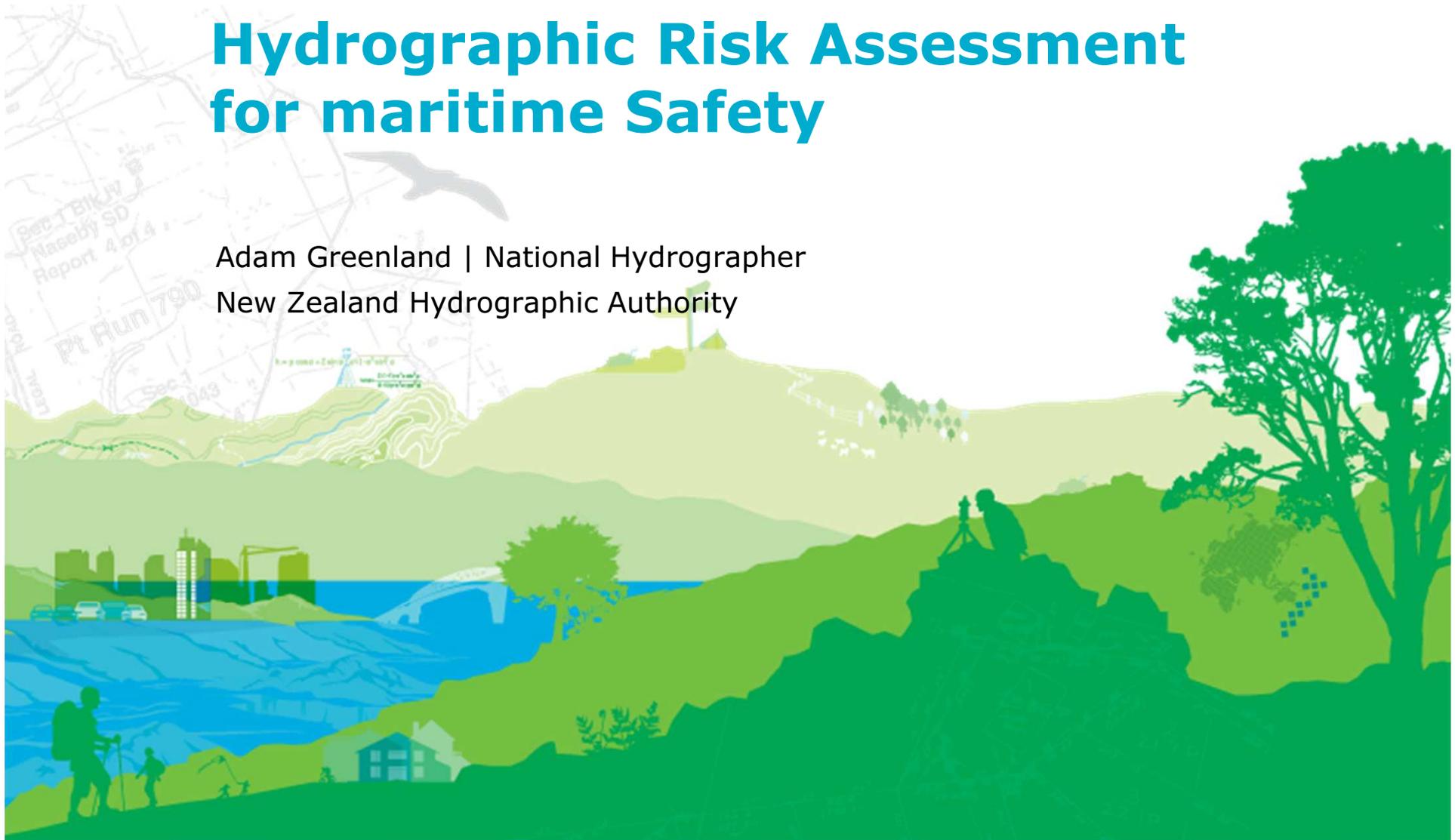


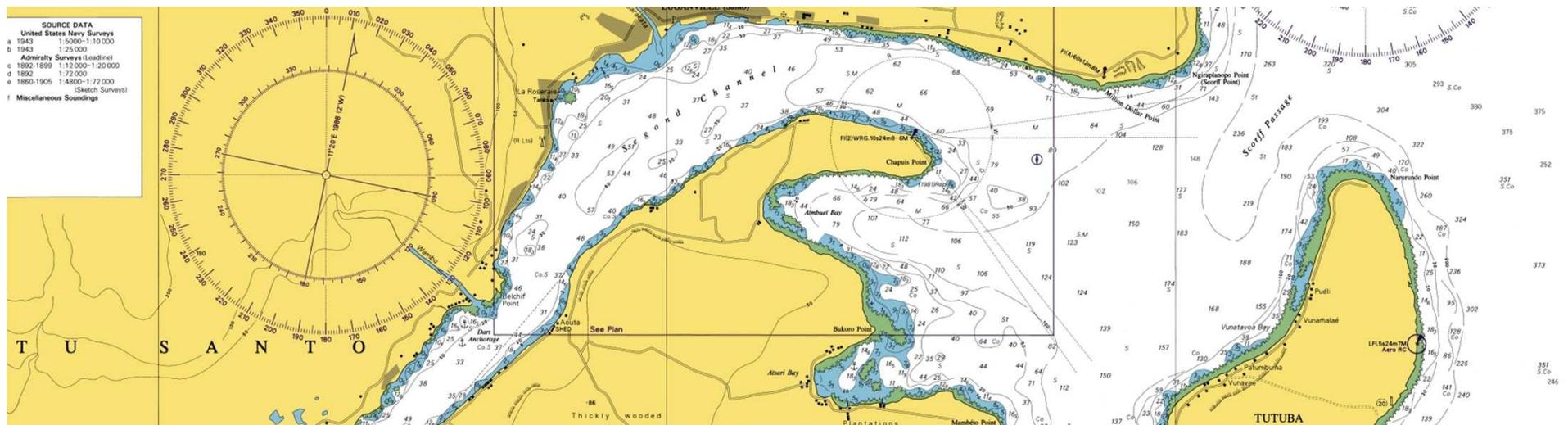
# Hydrographic Risk Assessment for maritime Safety

Adam Greenland | National Hydrographer  
New Zealand Hydrographic Authority



# Background

- Maritime safety a major concern in the South West Pacific for a number of years
- December 2011 LINZ & MFAT signed MOU, to improve navigational & maritime safety in SWP region
- Overarching goal: achieve accurate & adequate charting coverage in SWP



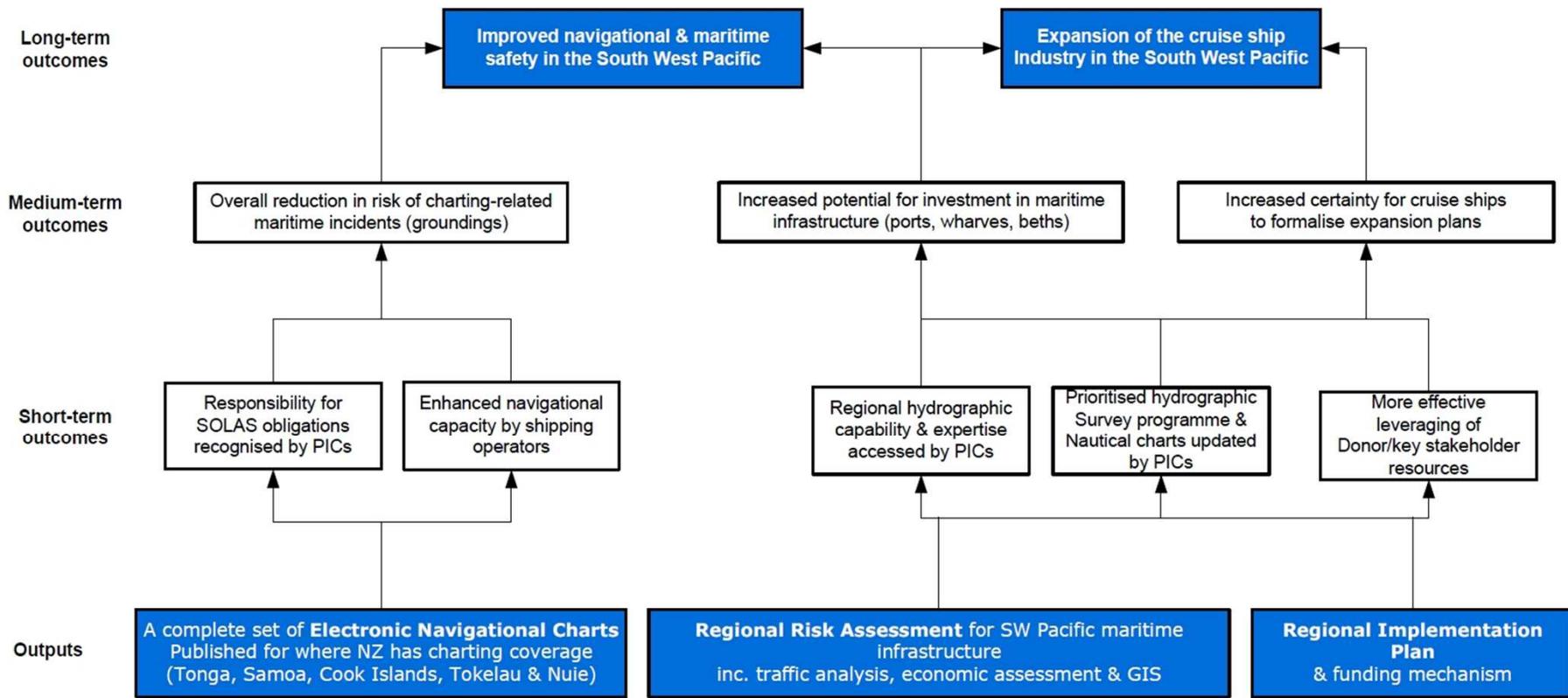
*Coming to an uncharted Island near you*



# Results Framework

## The Results Framework - Outputs, Outcomes and Goal

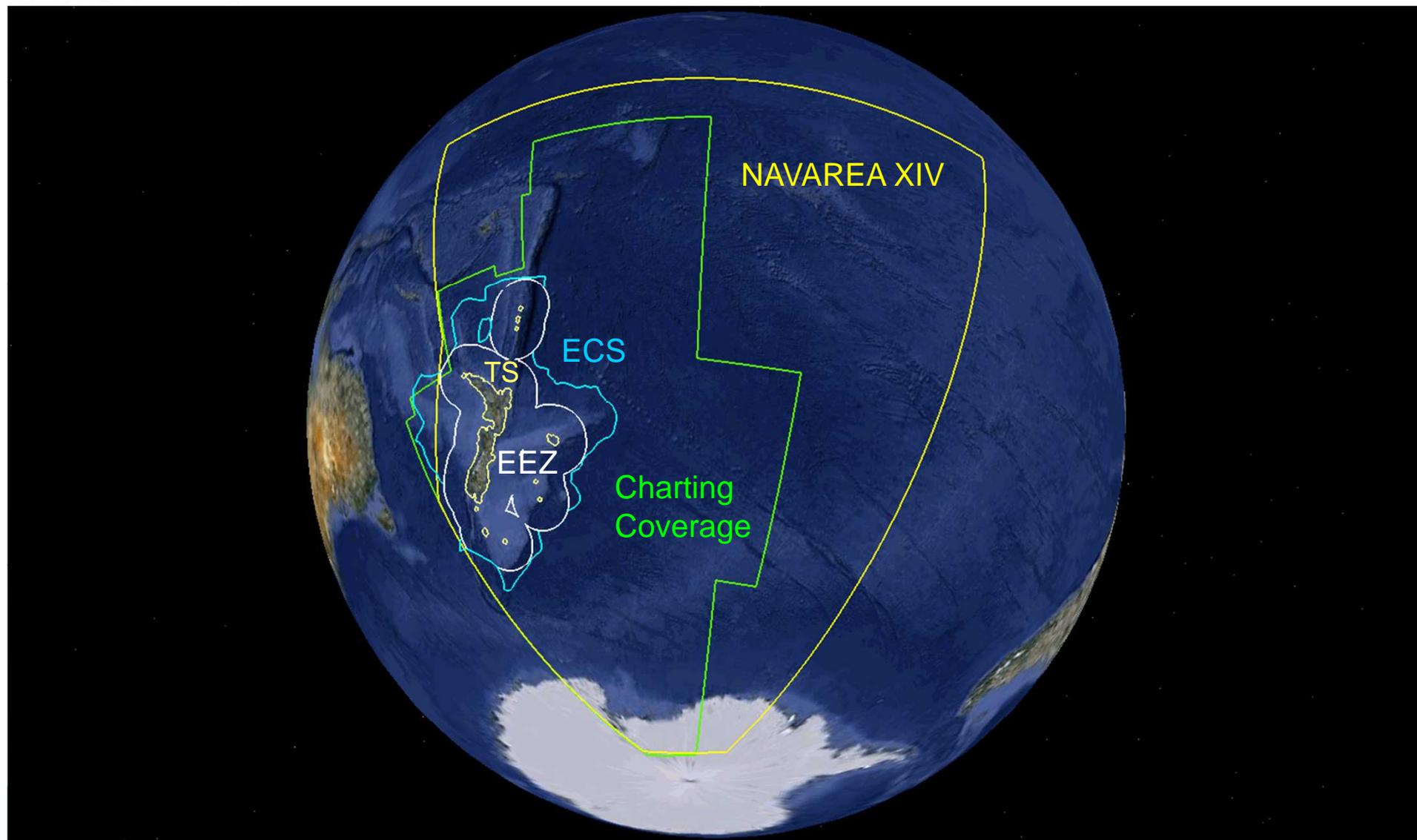
**Goal of the Activity: Accurate & adequate charting coverage in the South West Pacific**



(PICs = Pacific Island Countries)

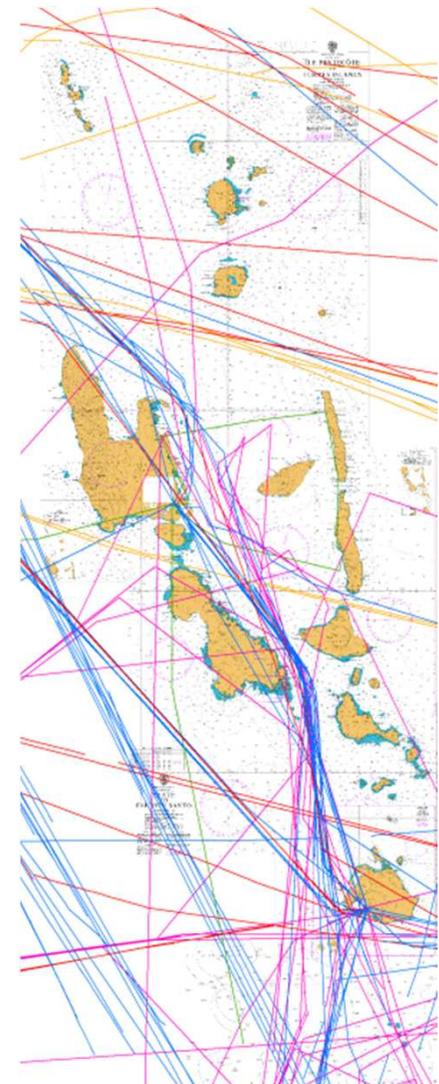
**Enduring South West Pacific Hydrography Risk Assessment Framework**

# NZ Hydrographic Authority Area of Responsibility



## Activities completed

- 42 ENC's published and maintained (60)
- Prototype Hydrography Risk Assessment Methodology developed
- Vanuatu pilot study (proof on concept)
  - S-AIS & domestic traffic analysis
  - In-country data gathering
  - Maritime Economic analysis
  - GIS Risk Assessment
  - Vanuatu Hydrography Risk Assessment results published
- Final Hydrography Risk Assessment Methodology published



# Risk based approach

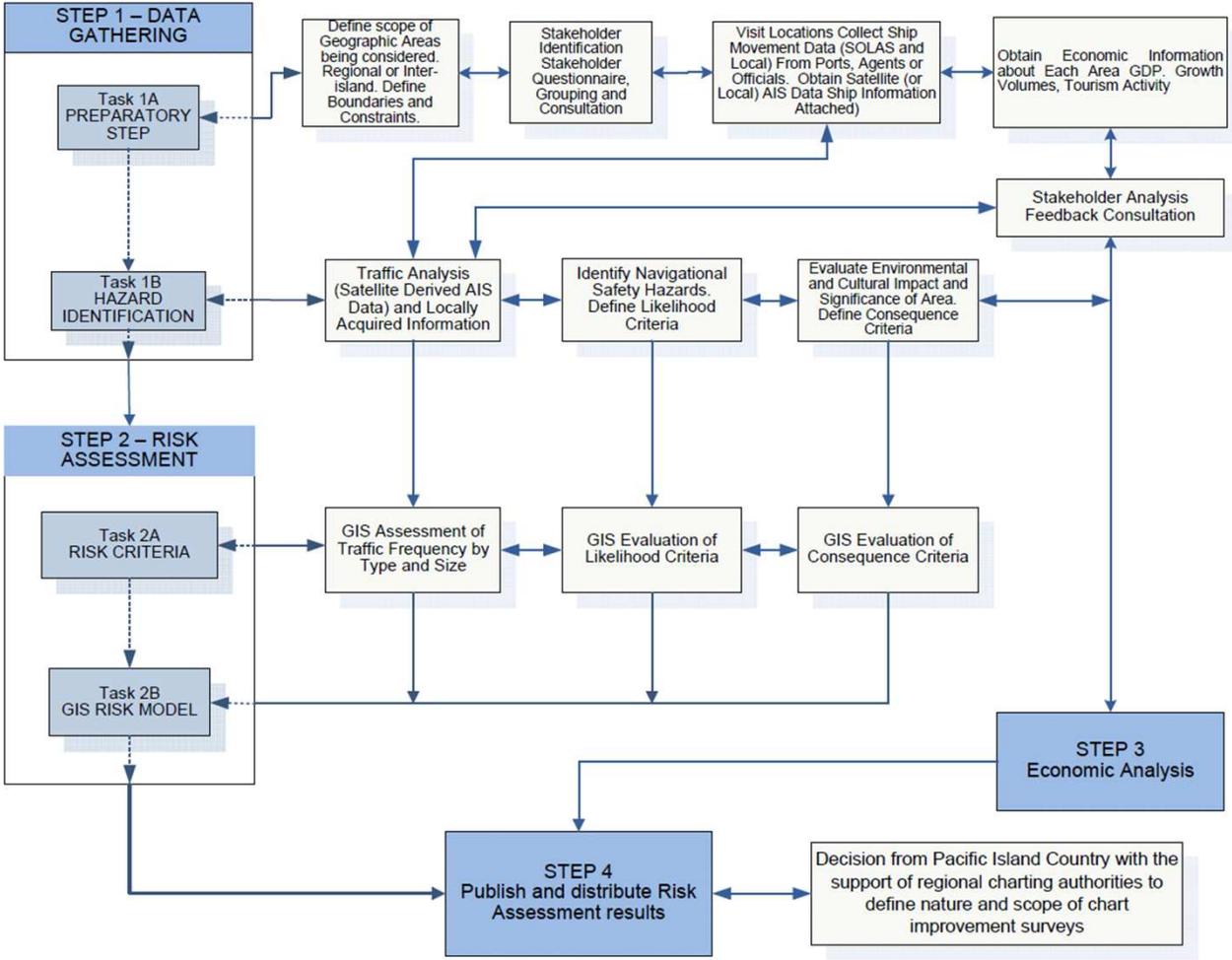
- IMO Formal Safety Assessment (FSA)
- 5 step proactive process (1995)
- 3 key components
  - Risk
  - Ship types & sizes
  - Economic growth
- 4<sup>th</sup> Factor
  - Environmental status

# GIS Risk Terrain Modelling (RTM)

- Risk = Freq (Likelihood) x Consequence
  - Identify Likelihood & Consequence risk factors – 29 in total including shipping traffic (Risk Matrix)
  - Create a risk model
  - Combine the likelihood & consequence to produce a risk score
- GIS RTM
  - Weighted Overlay Analysis is the scientific methodology by which RTM is achieved
  - Likelihood & Consequence factors combined
  - allows visualisation of complex data for presentation to decision makers

# Risk Assessment Methodology

**FLOW CHART OF RISK ASSESSMENT METHODOLOGY FOR SW PACIFIC**



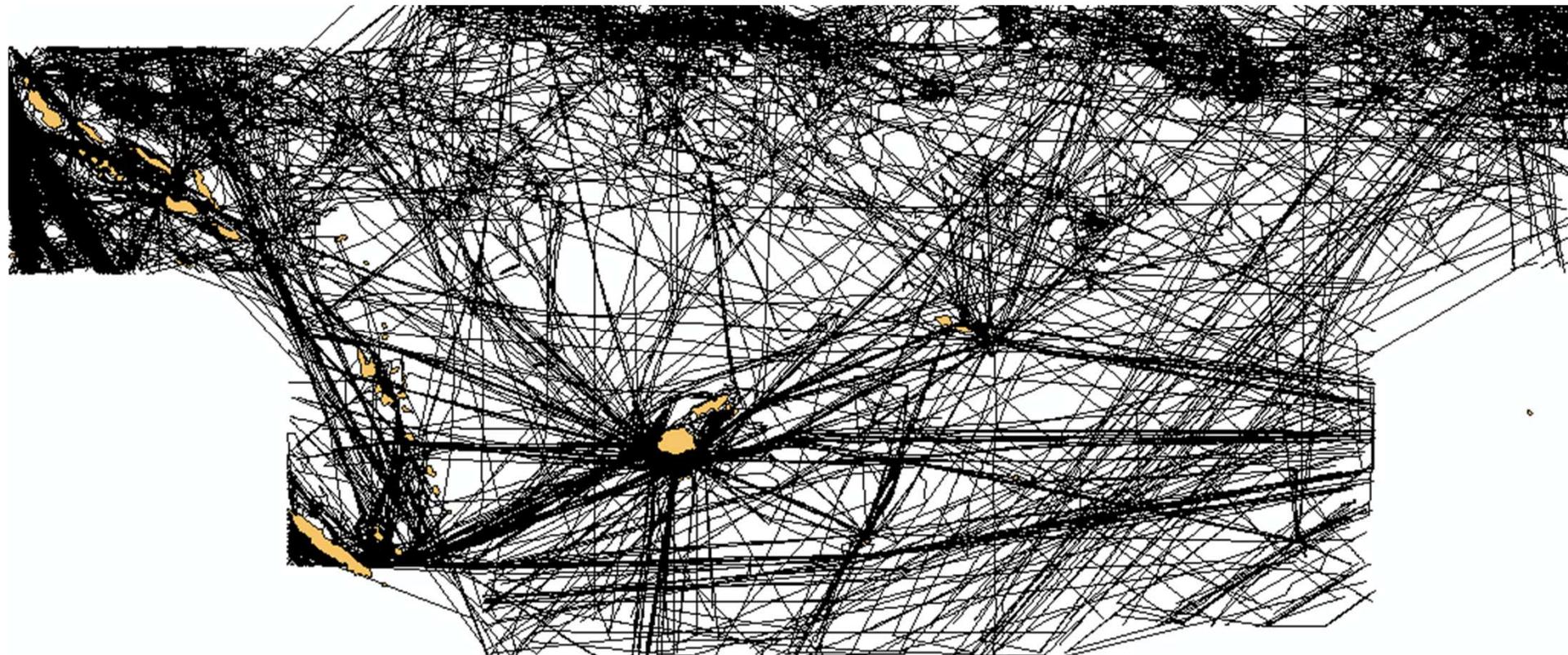
# Prioritisation Process for chart improvements

- Risk based
- Transparent against set criteria
- Clearly documented
- Systematic
- Uniformly applied

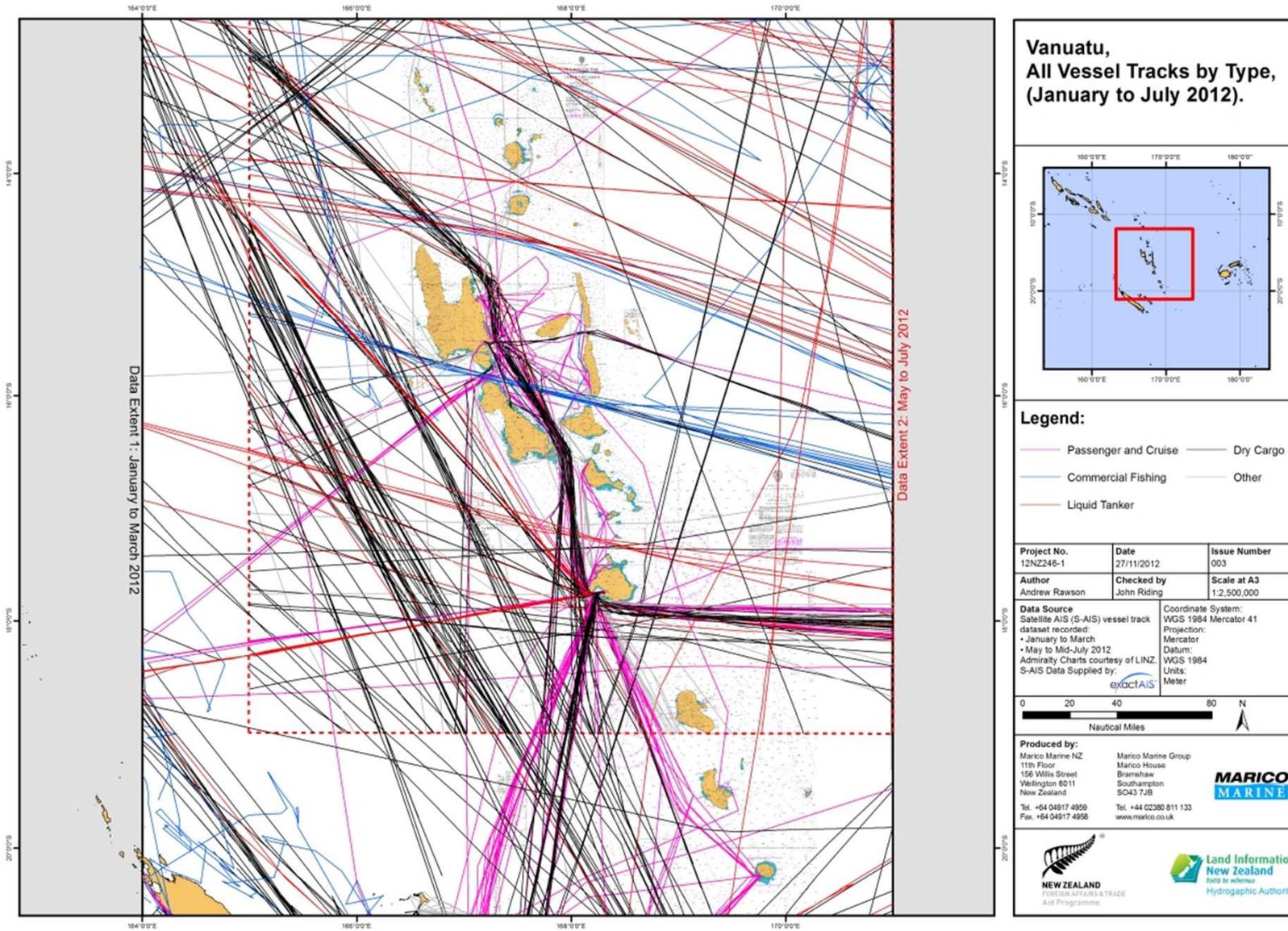
Prototype methodology & required input data must be designed before the project and then uniformly applied

A robust & data driven methodology for the identification of shipping routes at high risk

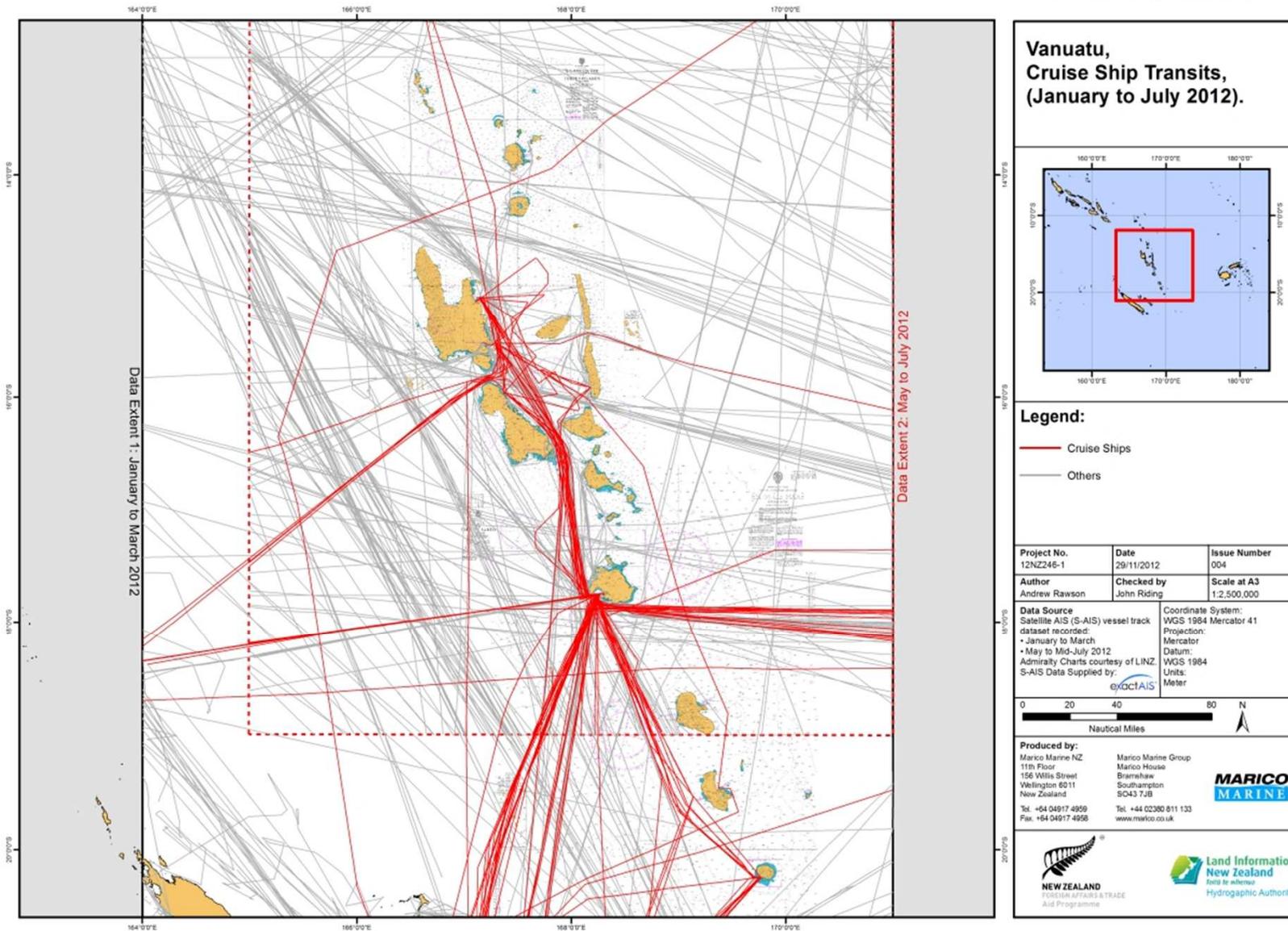
# S-AIS data



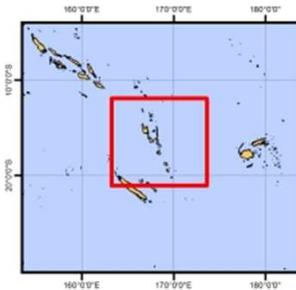
# Vanuatu – by vessel type



# Vanuatu – Cruise ships



**Vanuatu,  
Cruise Ship Transits,  
(January to July 2012).**

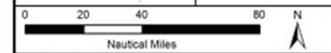


**Legend:**

- Cruise Ships
- Others

<b>Project No.</b> 12NZ246-1	<b>Date</b> 29/11/2012	<b>Issue Number</b> 004
<b>Author</b> Andrew Rawson	<b>Checked by</b> John Riding	<b>Scale at A3</b> 1:2,500,000

<b>Data Source</b> Satellite AIS (S-AIS) vessel track dataset recorded: - January to March - May to Mid-July 2012 Admiralty Charts courtesy of LINZ. S-AIS Data Supplied by: 	<b>Coordinate System:</b> WGS 1984 Mercator 41 <b>Projection:</b> Mercator <b>Datum:</b> WGS 1984 <b>Units:</b> Meter
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**Produced by:**

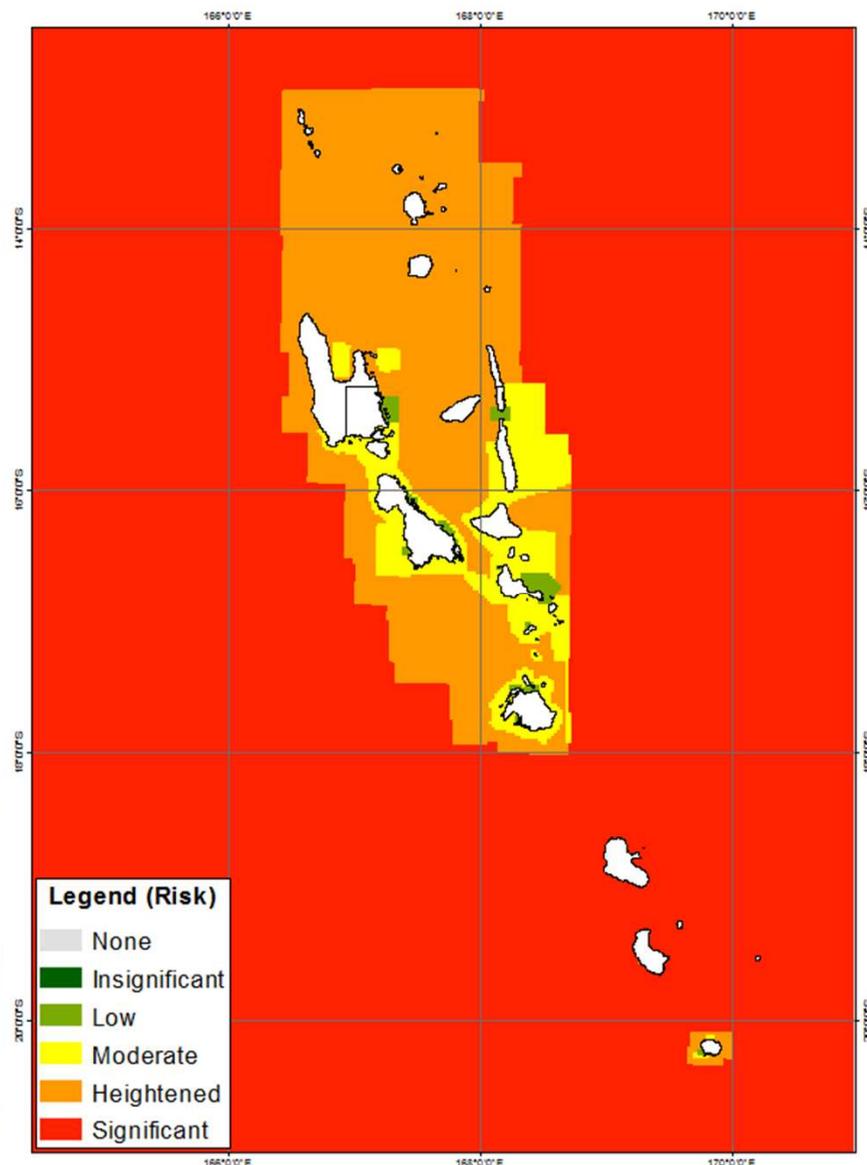
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Figure Reference Number: 12NZ246-1\_CruiseTransits\_v4

# Vanuatu – Risk Model Variables



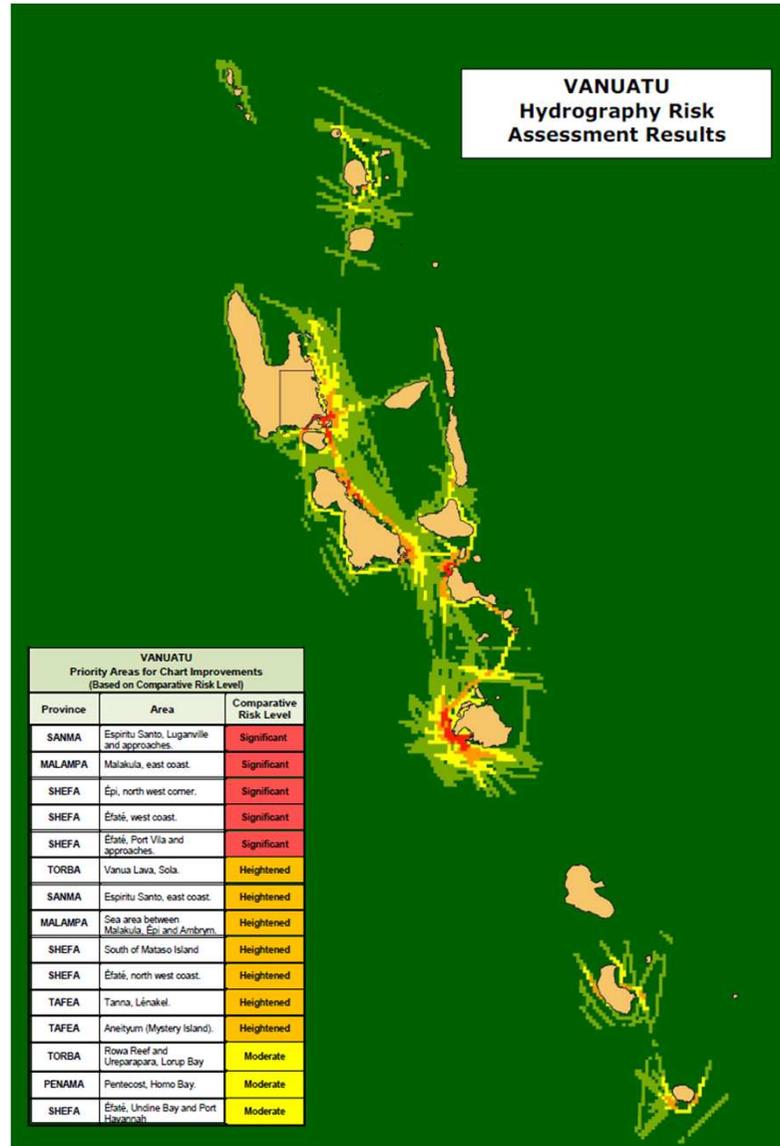
## Causation Risk Factors

- Bottom type
- Navigationally complexity
- **Chart quality - CATZOC**
- Aids to navigation
- Depth - bathymetry

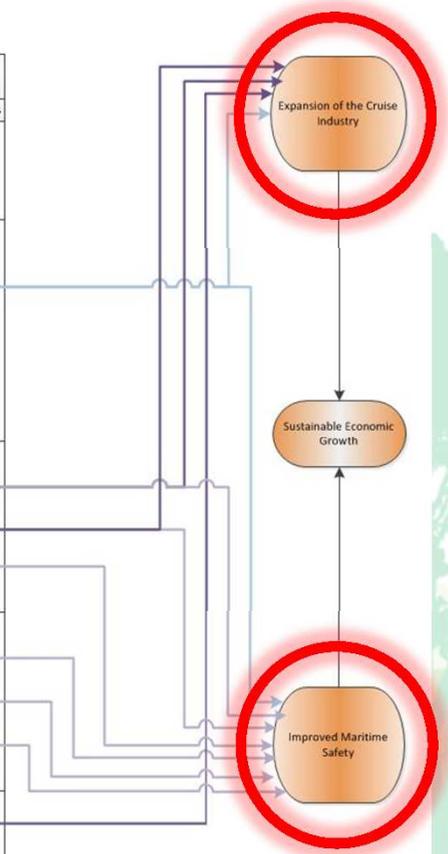
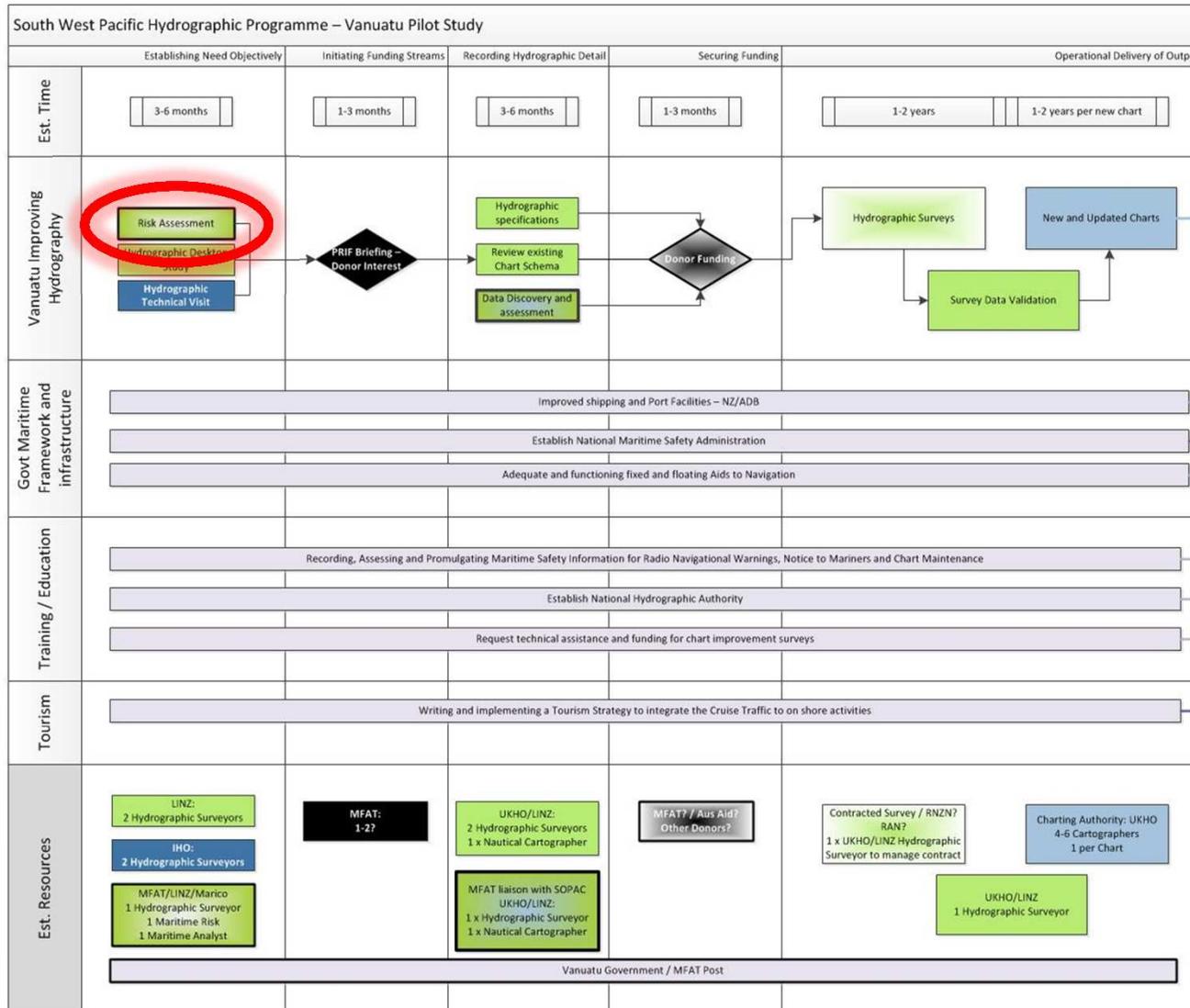
## Consequence Risk Factors

- Coral Reefs
- Mangroves
- Breeding grounds
- Protected sites
- Key infrastructure - ports

# Vanuatu - Results



# Vanuatu Pilot Study



# Publications & Outreach



- Publications
  - Hydrography Risk Assessment Methodology 280213
  - Vanuatu Risk Assessment Exec Summary 240113
  - Vanuatu Risk Assessment Final Report 260113
  - Vanuatu Risk Assessment Annexes 240113
- GIS [linz.wivolo.com](http://linz.wivolo.com)
- CB programmes: IMO, IALA
- Donors: (PRIF) MFAT NZ Aid, ADB, WB, JICA, EU

## Next Steps

- Risk Assessments
  - Cook Islands 7-20 Oct 2013
  - Tonga 25 Nov–7 Dec 2013
- Review CB programmes in SW Pacific:  
**SWPHC IHO Meeting Vanuatu 12-14 Nov 2013**
- Proposal to donors for funding
  - hydrographic surveys: (PRIF) MFAT NZ Aid, ADB, WB, JICA, EU
  - Risk assessments
- Establish LINZ/MFAT strategic partnership with shared long term outcomes

Vinaka  
Questions?

[agreenland@linz.govt.nz](mailto:agreenland@linz.govt.nz)