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Hydrographic Risk Assessment for maritime Safety

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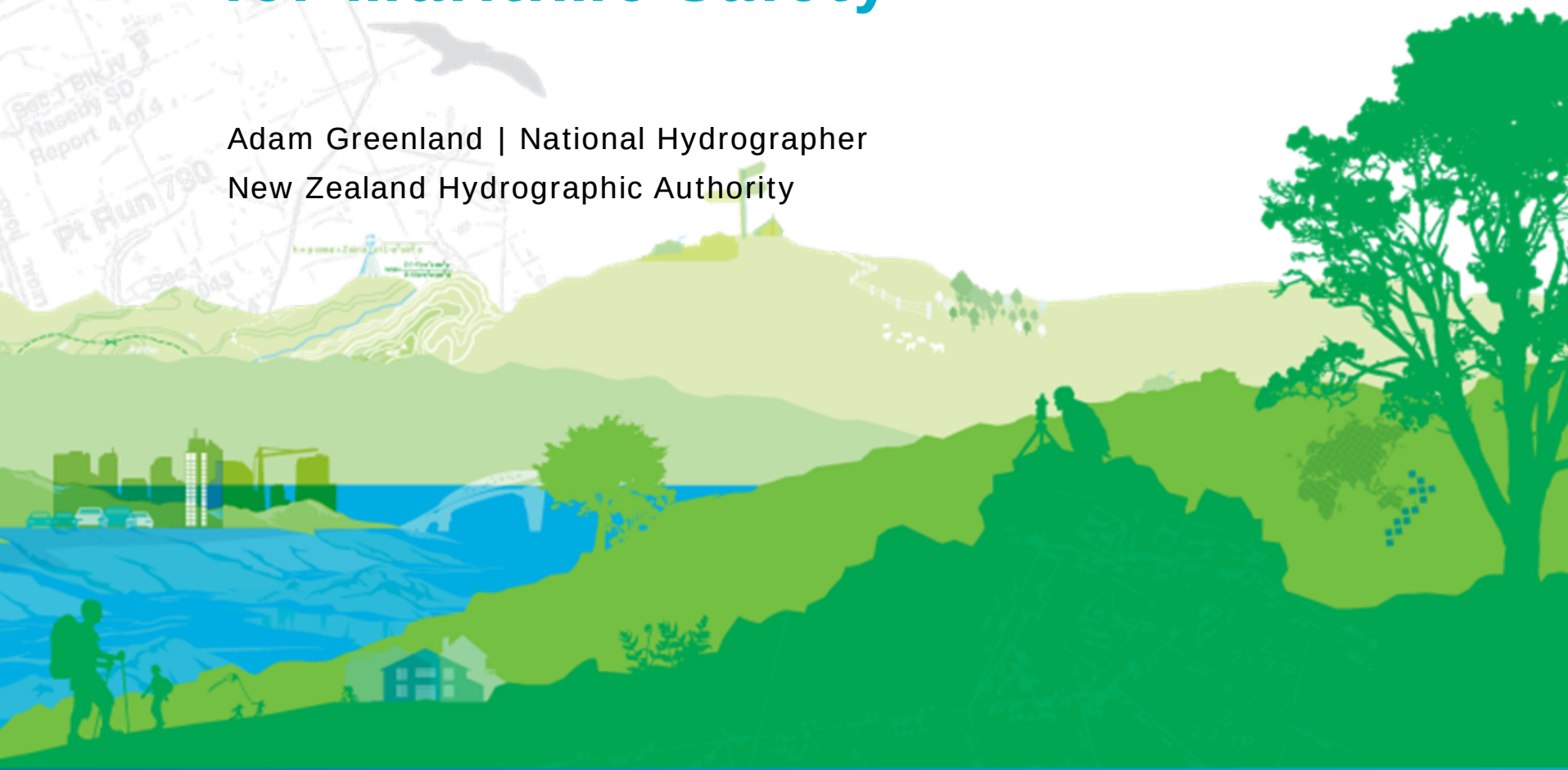
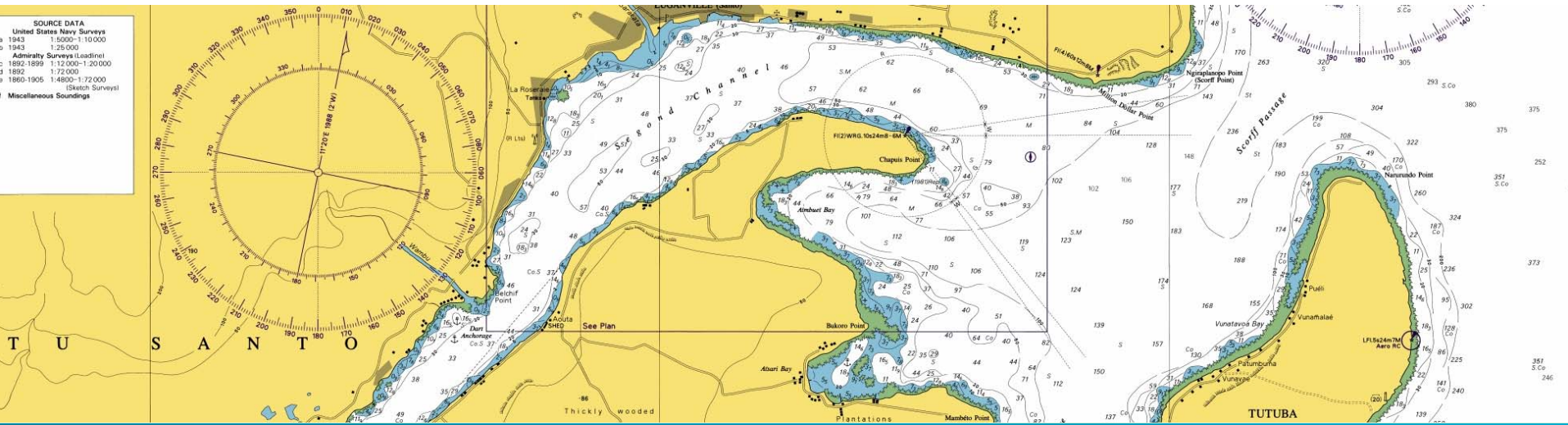
New Zealand Hydrographic Authority



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

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Results Framework

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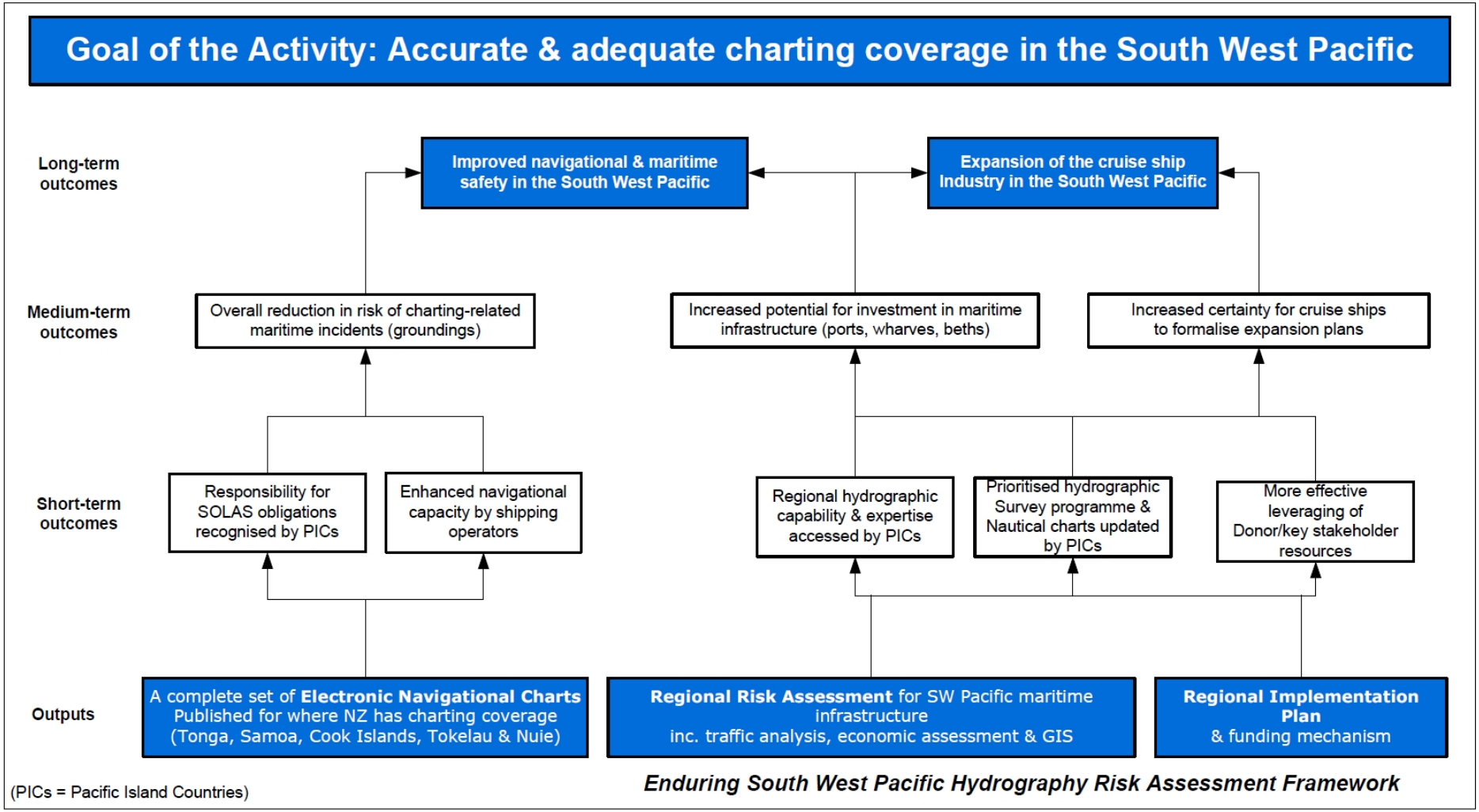
The Results Framework - Outputs, Outcomes and Goal



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Area of Responsibility

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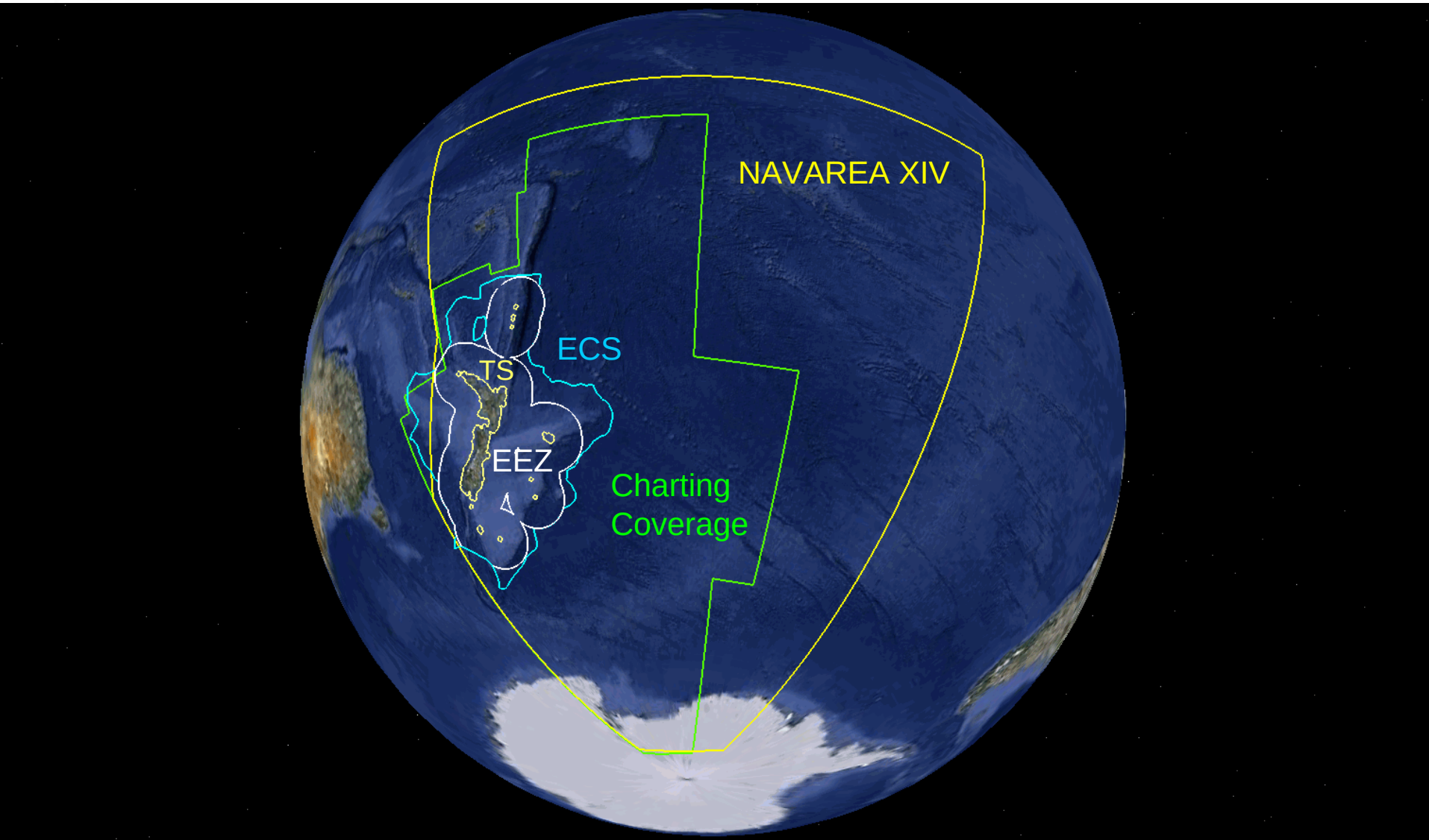
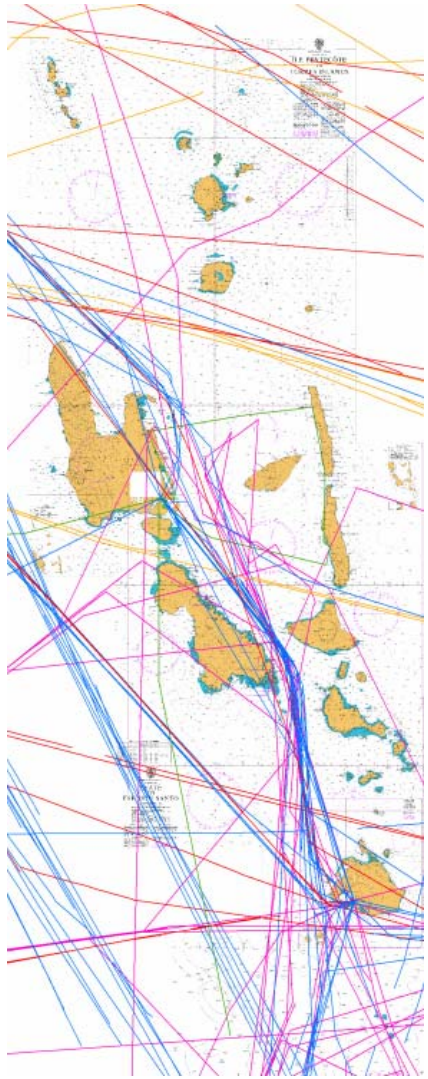


Activities completed

- 42 ENCs 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
- 4th Factor
  - Environmental status

GIS Risk Terrain Modelling (RTM)

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- 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

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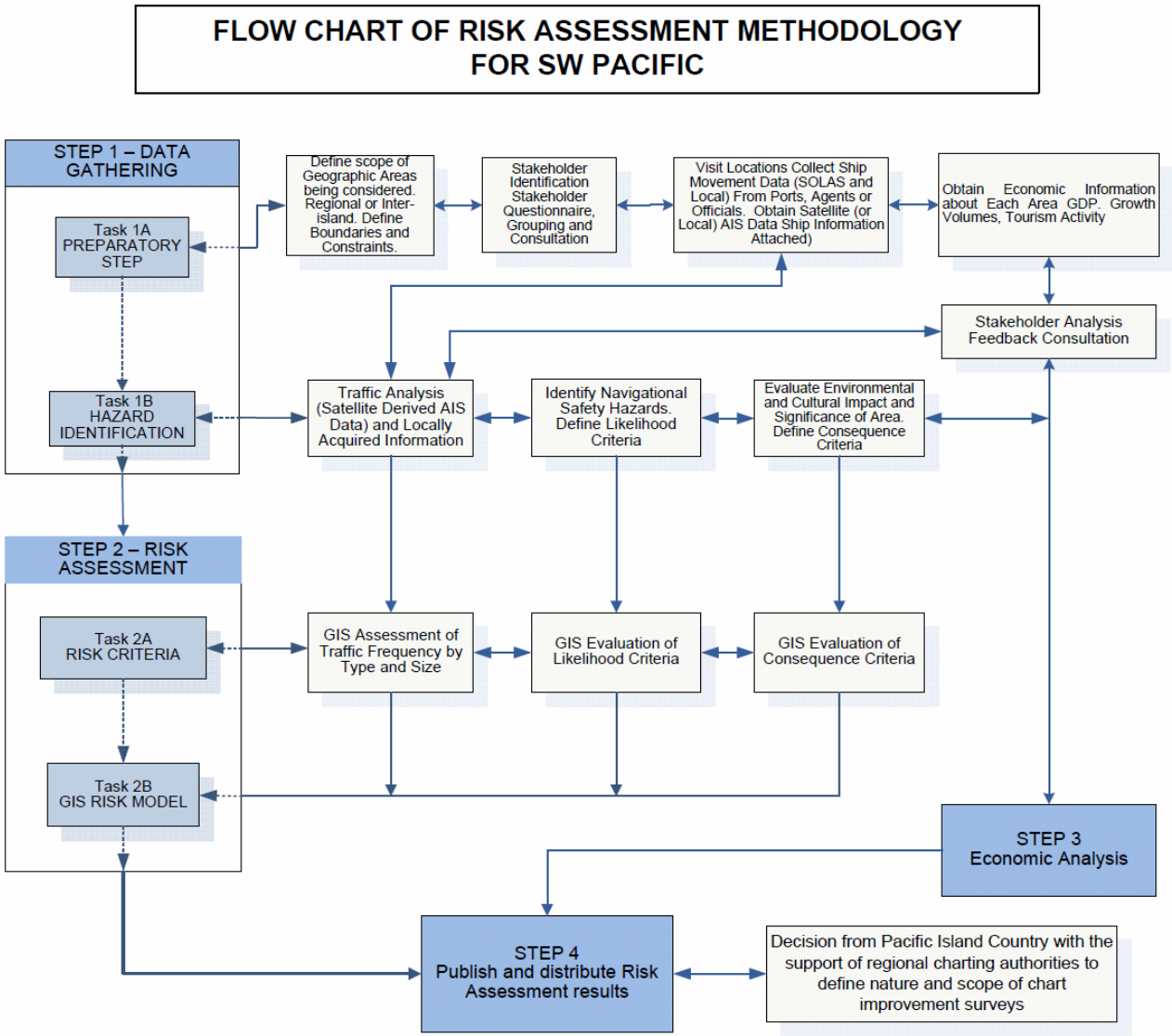

Prioritisation Process for chart improvements

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- 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

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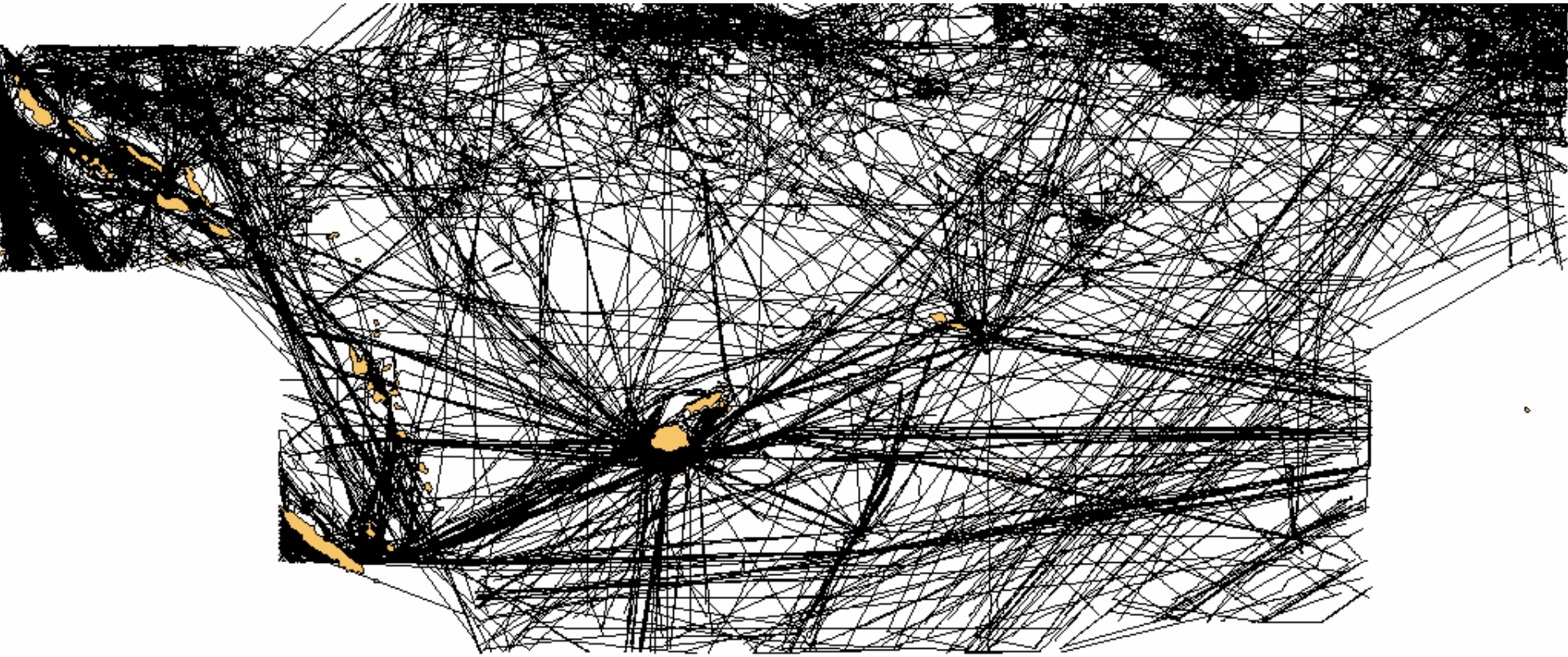

Vanuatu – by vessel type

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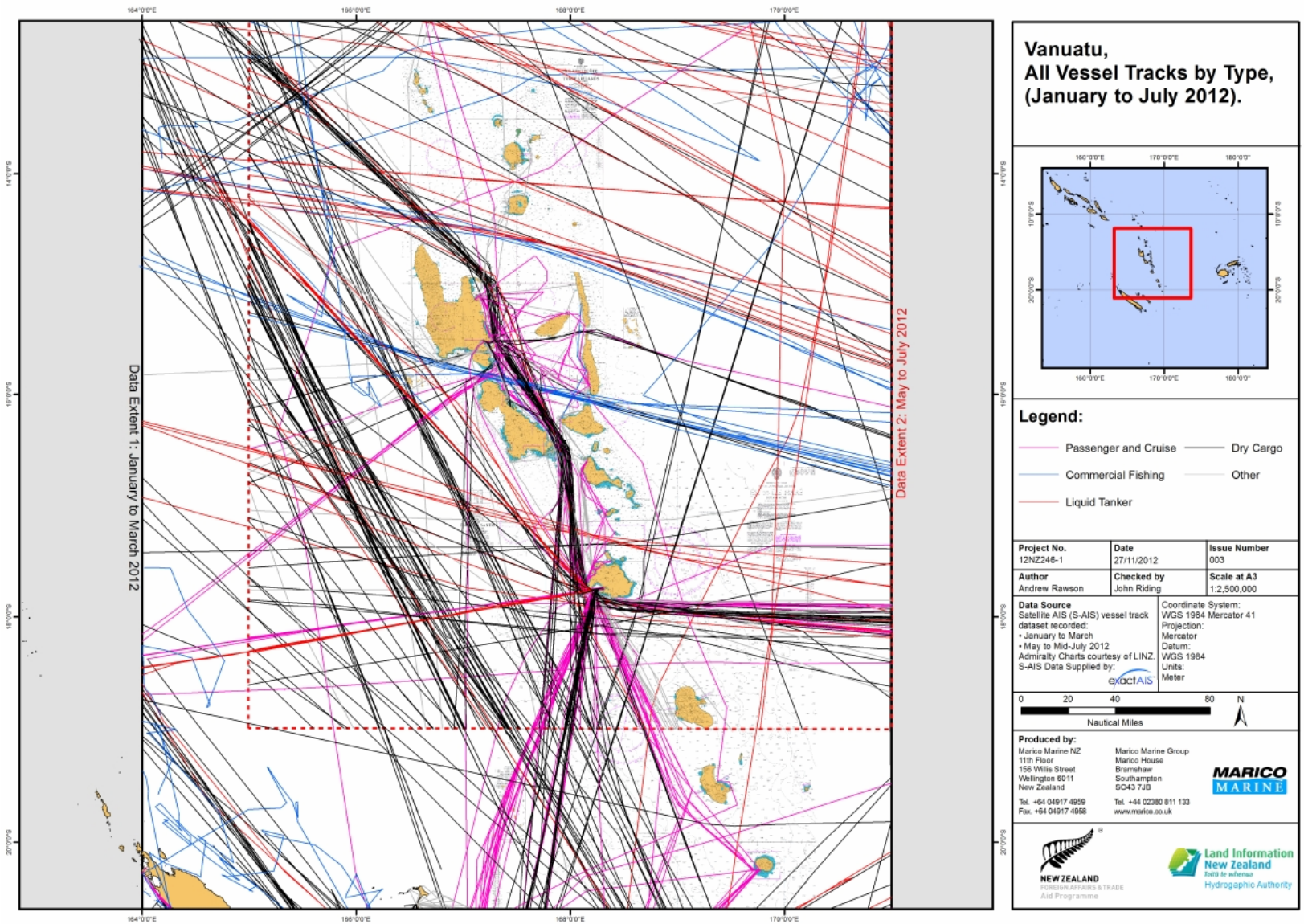

Figure Reference Number: 12NZ246-1_TransitVesselType_v3

Vanuatu – Cruise ships

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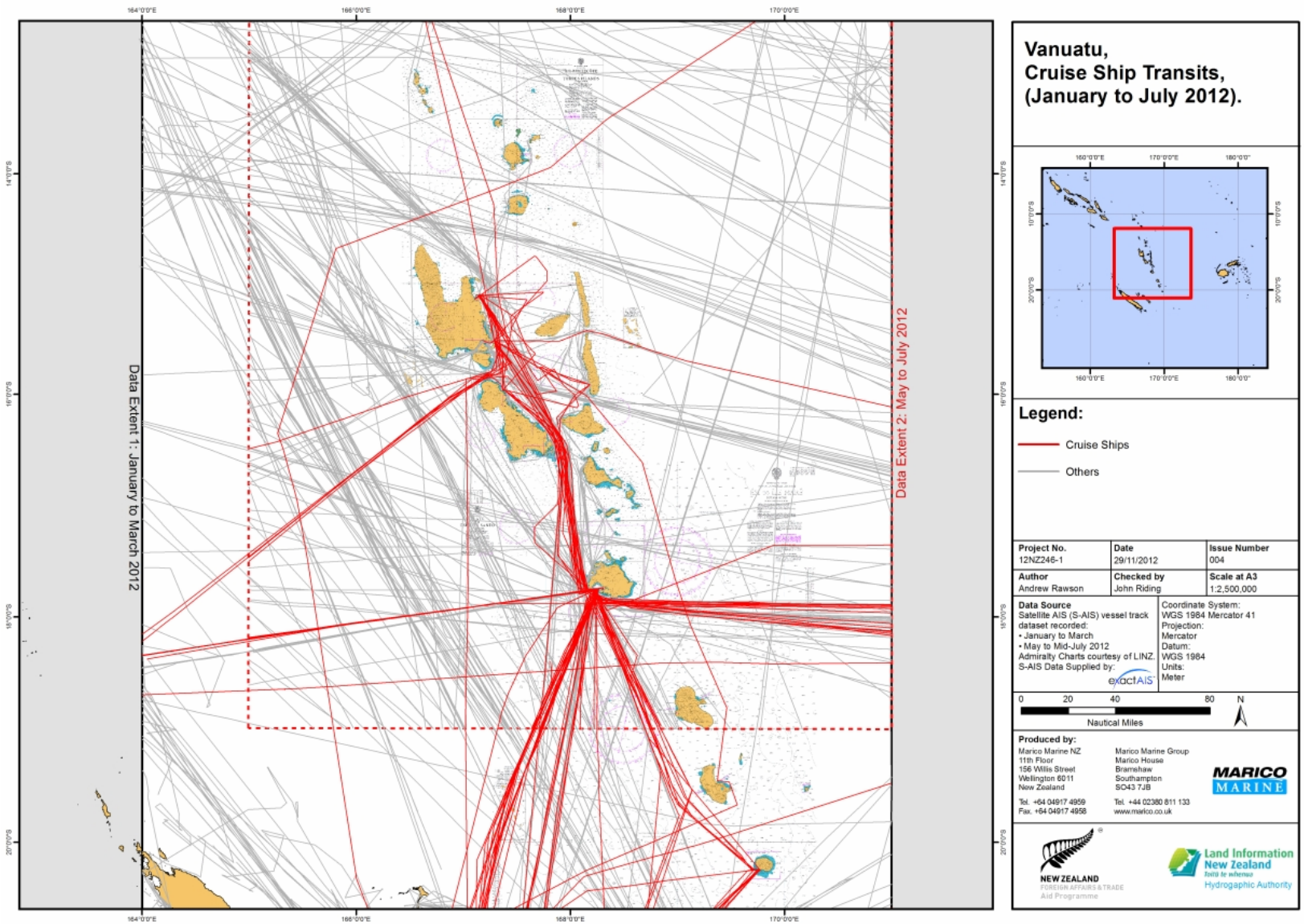
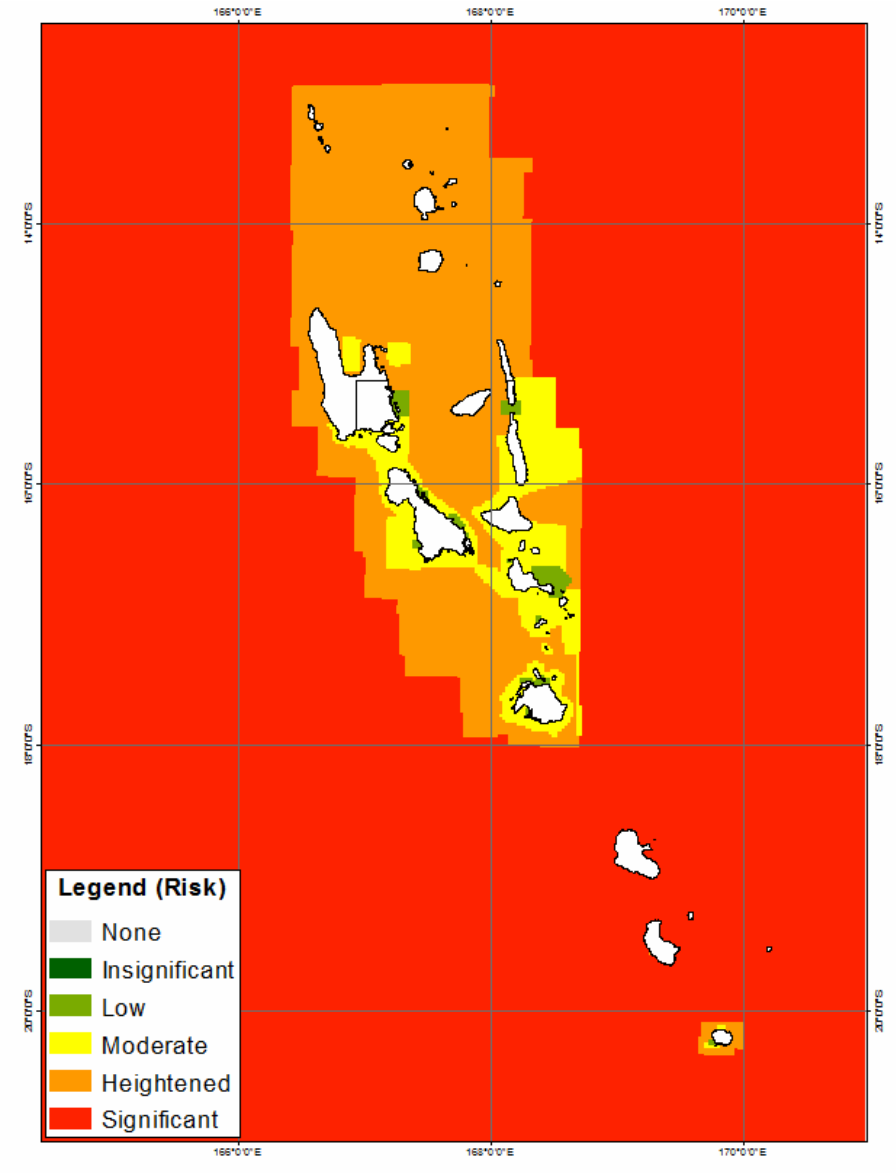


Figure Reference Number: 12NZ246-1_CruiseTransits_v4

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

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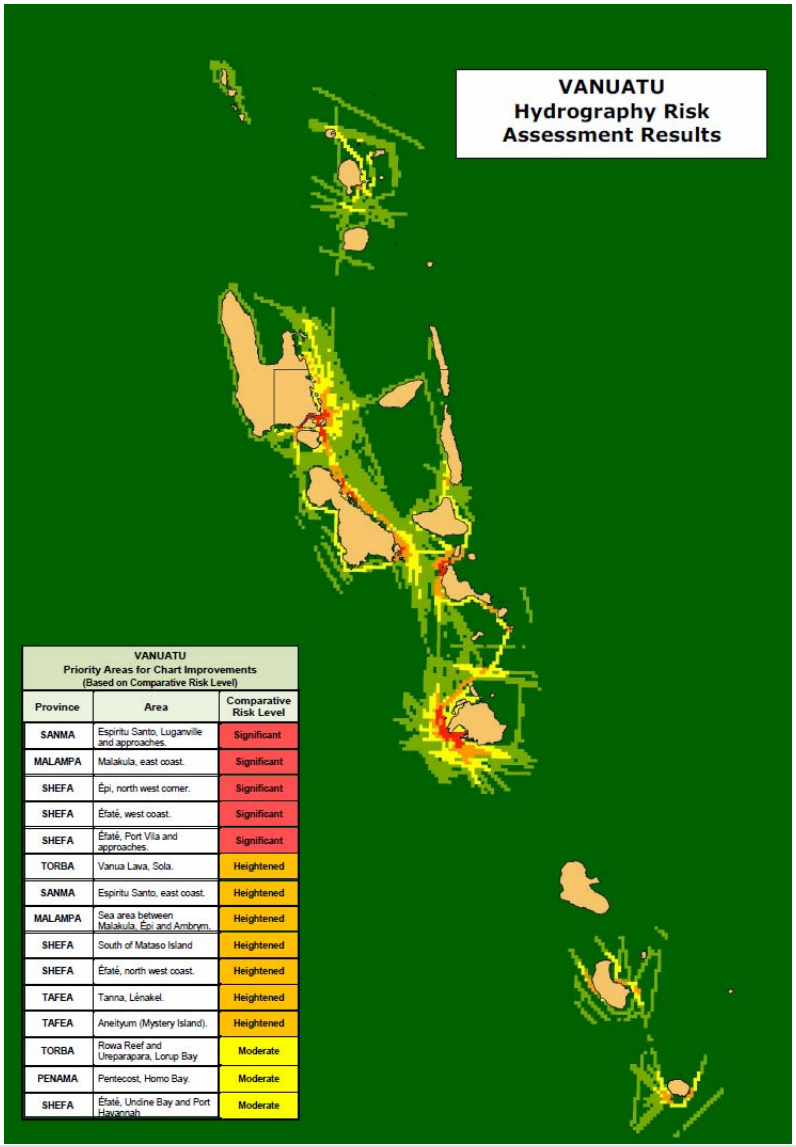

VANUATU
Priority Areas for Chart Improvements
(Based on Comparative Risk Level)

Province	Area	Comparative Risk Level
SANMA	Espiritu Santo, Luganville and approaches.	Significant
MALAMPA	Malakula, east coast.	Significant
SHEFA	Épi, north west corner.	Significant
SHEFA	Éfaté, west coast.	Significant
SHEFA	Éfaté, Port Vila and approaches.	Significant
TORBA	Vanua Lava, Sola.	Heightened
SANMA	Espiritu Santo, east coast.	Heightened
MALAMPA	Sea area between Malakula, Épi and Ambrym.	Heightened
SHEFA	South of Mataso Island	Heightened
SHEFA	Éfaté, north west coast.	Heightened
TAFEA	Tanna, Lénakel.	Heightened
TAFEA	Aneityum (Mystery Island).	Heightened
TORBA	Rowa Reef and Ureparapara, Lorup Bay	Moderate
PENAMA	Pentecost, Homo Bay.	Moderate
SHEFA	Éfaté, Undine Bay and Port Havannah	Moderate

Vanuatu - Results

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Area	IHO[1]	ADB[2]	Carnival[3]	Vanuatu[4]	Risk[5]
Unréparapara – Lorup Bay	✓		✓	✓	
Vanua Lava – Maseunar Channel (Port Patteson)			✓		
Vanua Lava – Ravenga Island			✓		
Espiritu Santo – Big Bay	✓				
Espiritu Santo – Hog Harbour	✓		✓	✓	
Ambae – Lolowai Bay		✓			
Espiritu Santo – Luganville & Approaches	✓	✓	✓	✓	✓
Île Pentecôte – Loltong Bay		✓			
Île Pentecôte – Homo Bay	✓		✓	✓	
Malakula - east coast					✓
Malakula - Wala Island	✓		✓	✓	
Malakula – Litzlitz		✓		✓	
Malakula – Port Sandwich		✓			
Malakula – Méténovor Bay	✓	✓	✓	✓	
Epi – north west corner					✓
Shepherd Islands - Tongoa wall	✓			✓	
Éfaté – west coast					✓
Éfaté - Port Vila & *Approaches*	✓	✓	✓	✓	✓
Tanna - Waisisi		✓	✓		
Tanna - Lenakel		✓	✓		
Tanna – Port Resolution				✓	
Aneityum (Mystery Island)	✓		✓	✓	

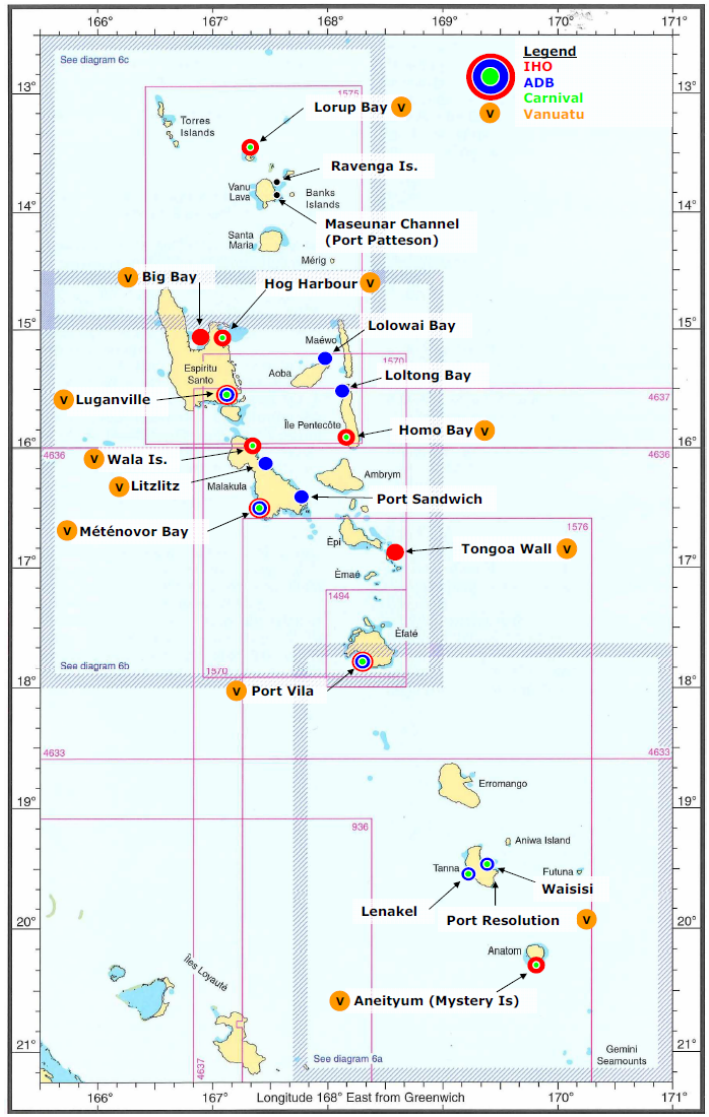
1 IHO Report on Hydrography and Nautical Charting in The Republic of Vanuatu, December 2011.

2 Vanuatu Inter-Island Shipping Support Project (Phase II), Volume 1: Main Report. Asian Development Bank, April 2010.

3 LINZ High Level Assessment of Carnival Australia Priorities for Hydrographic Survey in Vanuatu, September 2011 and areas of existing Carnival Australia survey data

4 Vanuatu NCMSI Sub-Committee

5 Comparative Risk Assessment - areas of **significant** risk



Vanuatu Pilot Study

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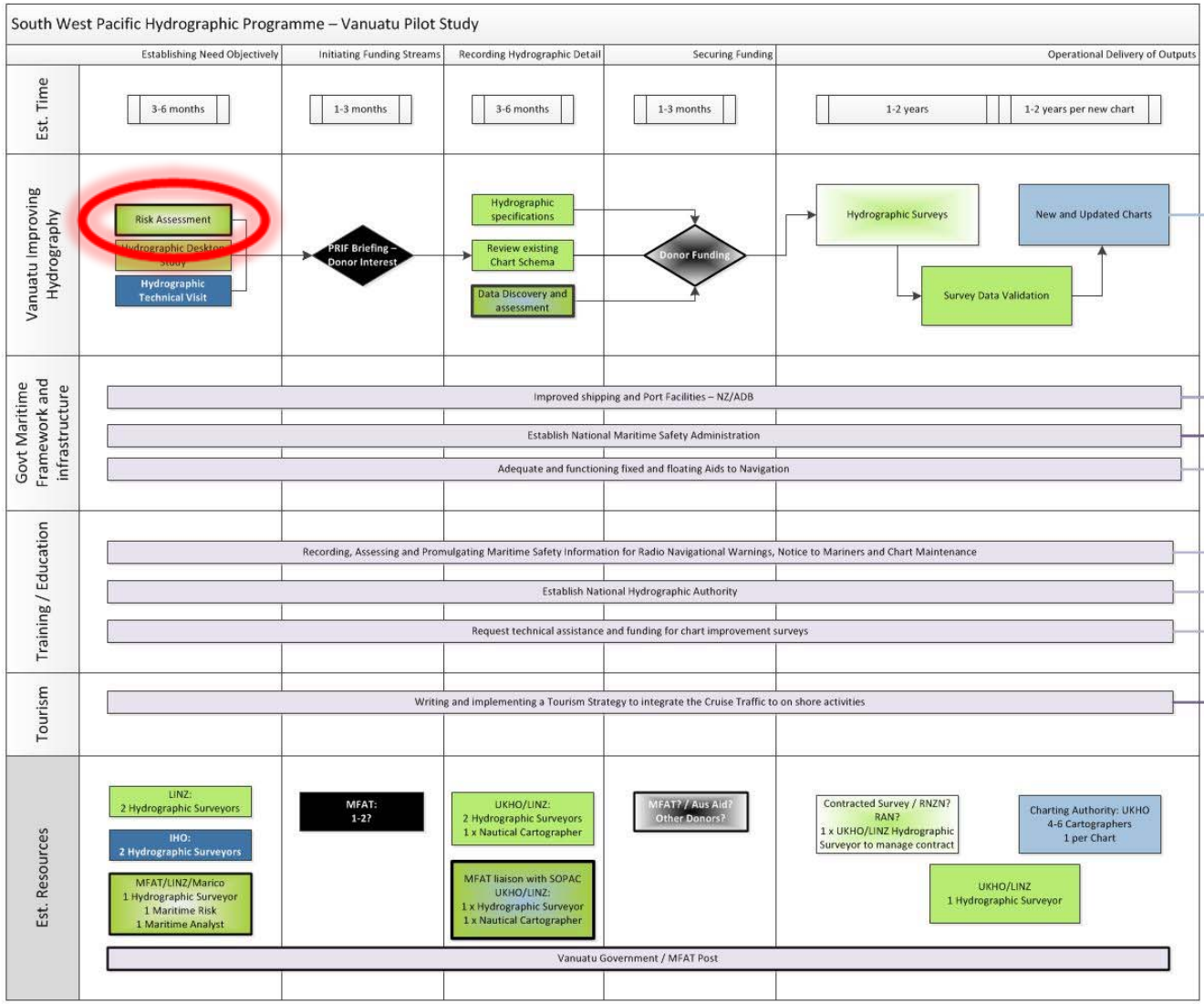

Publications & Outreach

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- 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
- CB programmes: IMO, IALA
- Donors: (PRIF) MFAT NZ Aid, ADB, WB, JICA, EU

Next Steps

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- Risk Assessments
  - Cook Islands 7-19 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

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Thank You

Questions?

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