Pacific Regional Navigation Initiative (PRNI)

Adam Greenland | National Hydrographer
Maritime Safety in the Pacific
MEMORANDUM OF UNDERSTANDING (MOU)

South-west Pacific Regional Hydrography Programme

between

Ministry of Foreign Affairs and Trade
195 Lambton Quay
Wellington 6011
New Zealand

Land Information New Zealand
NZ Hydrographic Authority
160 Lambton Quay
Private Box 5501
Wellington 6145
New Zealand

(Partner Agency or LINZ)
SWPRHP
Risk Assessments
Vanuatu
MEMORANDUM OF UNDERSTANDING
(MOU)

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between

Ministry of Foreign Affairs and Trade
195 Lambton Quay
Wellington 6011
New Zealand
(MFAT)

and

Land Information New Zealand
NZ Hydrographic Authority
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Wellington 6011
New Zealand

Pacific Regional Navigation Initiative (PRNI)
**PRNI Activity Outputs**

**Output 1: Pacific-wide Data Discovery**
- SPC to search database to identify data with potential for use to improve quality of existing charts
- SPC to work with PICs to release data to Primary Charting Authorities

**Output 2: Hydrographic Risk Assessment**
- LINZ to undertake risk assessments for Niue, Samoa & Tokelau

**Output 3: Capability/Capacity Building**
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**Output 4: Mitigation Measures**
- LINZ to lead prioritising and project managing mitigation measures including AtoN, hydrographic surveys and chart modernisation

**Output 5: Pacific-wide Partnerships**
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LINZ: Cooks, Niue, Samoa, Tokelau, Tonga
SPC: Other PICs
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<table>
<thead>
<tr>
<th>Traffic</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Increasing Risk ←———→</th>
<th>Factor</th>
<th>Category</th>
<th>Total Model</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Risk Source</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Safety</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential Loss of Life</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
<td>Severe</td>
<td>Death</td>
<td>Death</td>
<td>Death</td>
<td>Death</td>
<td>Death</td>
</tr>
<tr>
<td>Pollution Potential</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
<td>Severe</td>
<td>Death</td>
<td>Death</td>
<td>Death</td>
<td>Death</td>
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<tr>
<td>Meteorological Conditions</td>
<td>Sheltered at most times</td>
<td>Mostly sheltered</td>
<td>Moderate Exposure</td>
<td>Mostly exposed</td>
<td>Dependent on type of exposure</td>
<td>3</td>
<td>0.1560</td>
<td>0.1560</td>
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<td>Visibility</td>
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<td>Visited</td>
<td>Visibility</td>
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<td>Visited</td>
<td>Challengedeficit</td>
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<td>Navigational Complexities</td>
<td>Open Sea</td>
<td>Inshore</td>
<td>Offshore Navigation</td>
<td>Coastal Navigation</td>
<td>Port Approaches</td>
<td>Combined</td>
<td>Navigation</td>
<td>Offshore</td>
<td>Offshore</td>
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<td>Aids to Navigation</td>
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<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<td>Bathymetry</td>
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<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<td>Navigational Hazards</td>
<td>Proximity to Known Reefs</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Environmental impact</td>
<td>Proximity to Large Reef (High Quality or Isolated Victoria)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Yes</td>
<td>Yes</td>
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### Risk Model – Low Traffic Areas (SWP)

<table>
<thead>
<tr>
<th>Consequence Risk Criteria</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Increasing Risk ←———→</th>
<th>Factor</th>
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<th>Total Model</th>
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<tbody>
<tr>
<td>Cultural Sensitivity Areas</td>
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<td></td>
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<tr>
<td>Proximity to Local Cultural Protected/Important Sites</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Economically Sensitive Areas</td>
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<tr>
<td>Proximity to Sites of High Economic Contribution</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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### Risk Model – Low Traffic Areas (SWP)

<table>
<thead>
<tr>
<th>Weightage</th>
<th>Category</th>
<th>Total Model</th>
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</thead>
<tbody>
<tr>
<td>0.50x40</td>
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<td>0.1500</td>
</tr>
<tr>
<td>0.15</td>
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<td>0.1500</td>
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</tbody>
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*Note: The table represents a risk assessment model for low traffic areas (SWP) with various factors and their implications on risk assessment. The model uses a combination of qualitative and quantitative measures to determine the overall risk level.*
## Risk model – high traffic areas (NZ)

<table>
<thead>
<tr>
<th>Traffic</th>
<th>Potential Loss of Life</th>
<th>Potential Oil Spill</th>
<th>Walkway Damage</th>
<th>Sailboat Draft</th>
<th>Economic Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>Insignificant</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
<td>Catastrophic</td>
</tr>
<tr>
<td>Model Weighting</td>
<td>42.0%</td>
<td>38.0%</td>
<td>9.0%</td>
<td>15.0%</td>
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<tr>
<td>Overall Weighting</td>
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<table>
<thead>
<tr>
<th>Charting</th>
<th>Chart Quality</th>
<th>Survey Age</th>
<th>Chart Adequacy</th>
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<tbody>
<tr>
<td>Rating</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Model Weighting</td>
<td>3</td>
<td>30.0%</td>
<td>5.00%</td>
</tr>
<tr>
<td>Overall Weighting</td>
<td>10.00%</td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Route Characteristics</th>
<th>Navigational Complexity</th>
<th>Depth of Water</th>
<th>Traffic Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>Insignificant</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Model Weighting</td>
<td>8.75%</td>
<td>5.83%</td>
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</tr>
<tr>
<td>Overall Weighting</td>
<td>2.92%</td>
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</tr>
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</table>

<table>
<thead>
<tr>
<th>MetOcean</th>
<th>Prevailing Wave/Wind</th>
<th>Seasonal Variation</th>
<th>Visibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>Sheltered at Most Times</td>
<td>Mainly Sheltered</td>
<td>Poor Visibility</td>
</tr>
<tr>
<td>Model Weighting</td>
<td>5.83%</td>
<td>2.92%</td>
<td></td>
</tr>
<tr>
<td>Overall Weighting</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Navigational Hazards</th>
<th>Charted Tidal Hazards</th>
<th>Restricted Areas</th>
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<tbody>
<tr>
<td>Rating</td>
<td>Available</td>
<td>No Passage</td>
</tr>
<tr>
<td>Model Weighting</td>
<td>7.5%</td>
<td>7.5%</td>
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<tr>
<td>Overall Weighting</td>
<td>25%</td>
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</table>

<table>
<thead>
<tr>
<th>Bathymetry</th>
<th>Dynamic Seabed - Estuarial</th>
<th>Sediment/Geologic Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>Insignificant</td>
<td>Low</td>
</tr>
<tr>
<td>Model Weighting</td>
<td>7.5%</td>
<td>7.5%</td>
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<tr>
<td>Overall Weighting</td>
<td>25%</td>
<td></td>
</tr>
</tbody>
</table>

### Consequence Risk Criteria

<table>
<thead>
<tr>
<th>Loss of Life</th>
<th>Response Complexity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property</td>
<td>100.0%</td>
</tr>
<tr>
<td>Model Weighting</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Impact</th>
<th>Property Value Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal Reserves, World Heritage</td>
<td></td>
</tr>
<tr>
<td>Marine Reserves</td>
<td></td>
</tr>
<tr>
<td>Coastal Reserves</td>
<td></td>
</tr>
<tr>
<td>Waterfront Resource</td>
<td></td>
</tr>
<tr>
<td>Aquatic/Fishery Resource</td>
<td></td>
</tr>
<tr>
<td>Cultural Sites</td>
<td></td>
</tr>
<tr>
<td>Aboriginal/ Treaty History Sites</td>
<td></td>
</tr>
<tr>
<td>Recreational/Social Amenity</td>
<td></td>
</tr>
<tr>
<td>Model Weighting</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Economic Impact

<table>
<thead>
<tr>
<th>Economic Impact</th>
<th>Property Value Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Infrastructure (Berths) - Economic Coordinator</td>
<td></td>
</tr>
<tr>
<td>贡献</td>
<td>N/A</td>
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</table>

<table>
<thead>
<tr>
<th>Economic Impact</th>
<th>Property Value Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity to Sites of High Economic Contribution</td>
<td></td>
</tr>
<tr>
<td>贡献</td>
<td>N/A</td>
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### Phases of Development

#### PHASE 1
- Collection and circulation of nautical information, necessary to maintain existing charts and publications.
  - Form National Authority (NA) and/or National Hydrographic Coordinating Committee (NHCC).
  - Create/improve current infrastructure to collect and circulate information.
  - Strengthen links with charting authority to enable updating of charts and publications.
  - Minimal training needed.
  - Strengthen links with NAVAREA Coordinator to enable the promulgation of safety information.

#### PHASE 2
- Creation of a surveying capability to conduct:
  - Coastal projects
  - Offshore projects
  - Establish capacity to enable surveys of ports and their approaches.
  - Maintain adequate aids to navigation.
  - Build capacity to enable surveys in support of coastal and offshore areas.
  - Build capacity to set up hydrographic databases to support NA/NHCC.
  - Provide basic geospatial data via MSDI.
  - Requires funding for training, advising and equipment or contract survey.

#### PHASE 3
- Produce paper charts, ENC and publications independently.
  - The need shall be thoroughly assessed. Requires investment for production, distribution and updating.
  - Alternatively, bi-lateral agreements for charting can provide easier solutions in production and distribution (of ENC through RENCs) and rewards.
  - Further development of MSDI.
Hydrography Governance

Assist PICs to deliver on SOLAS V/9 international treaty obligations for hydrographic services (governance, policy, resources, oversight)

IHO CB Phase 1
- Establish National Hydrographic Authority
- Establish National Hydrographic Coordinating Committee
- Establish National MSI Coordinator position
Capability building & training

- **Formal training**
  - Cat A/B Hydrographic Surveyor
  - Cat B Nautical Cartographer
  - MSI Coordinator
  - AtoN

- **Work placements**
  - Cartography
  - Surveying
  - MSI/NtM

- **Available through**
  - PRNI
  - SWPHC
  - IHO/IMO/IALA
  - Donor programmes
IHO Capacity Building Strategy

5.3.3 Risk Assessment

A risk assessment provides a robust basis for prioritising a national/regional charting programme. The risk analysis methodology is evidence-based and objective against set criteria. It includes AIS traffic analysis and an economic assessment. The main output is a risk heat map which allows governments, charting authorities and other interested parties to come to a conclusion about the nature and scope of charting improvements and related maritime safety initiatives. A GIS is used for the analysis and to display the results. This allows complex data to be easily accessed and understood by key stakeholders to aid decision making and presents a compelling case for action.
Open source risk assessment

- how the concept of an evidence led hydrography risk assessment has been adopted as part of the International Hydrographic Organization Capacity Building Strategy and embraced by the international maritime community
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Mitigation measures

- Hydrographic surveys
- Chart modernisation programme
- Aids to Navigation (AtoN) assessment
Luganville survey
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