20TH MEETING OF THE SOUTH WEST PACIFIC HYDROGRAPHIC COMMISSION (SWPHC20)
22-24 February 2023

NATIONAL REPORT FROM NEW ZEALAND TO THE SWPHC20

References:

A. IHO Resolution 2/1997 as amended (see doc. C3-04.2A, Appendix to Annex A)
B. IHO Circular Letter 20/2019, The IHO Online Form System for responses to Circular Letters and input to IHO Publications (P-5 and C-55): link
   Online system for P-5 (Yearbook): link
   Online system for C-55 (Status of Surveys and Charting Worldwide): link
C. IHO Strategic Plan: link
D. IHO IRCC CL 01/2021 IHO Strategic Plan for 2021-2026 – Procedure for measuring the Strategic Performance Indicator (SPI) allocated to IRCC: link

Executive summary

1. Hydrographic Office / Service:
   a) Name of the institution: Toitū Te Whenua Land Information New Zealand (LINZ).

   b) Description: The National Hydrographer (Adam Greenland) and Group Manager Hydrography (Rachel Gabara) lead the New Zealand Hydrographic Authority (NZHA) in partnership. Both positions report to the Head of Location Information, Aaron Jordan. The Location Information group is part of the Customer Delivery group, lead by Jan Pierce, Kaihautū - Deputy Secretary, Customer Delivery.

      The NZHA comprises 18 personnel, including two hydrographic surveyors, four nautical cartographers, two marine geospatial data specialists, three hydrographic systems analysts and a Technical Change Leader who leads a programme of work to implement the S-100 Universal Hydrographic Data Model and move the NZHA to a digital first, data centric environment.

   c) Submitted by: Stuart Caie, Manager Hydrographic Survey, scaie@linz.govt.nz

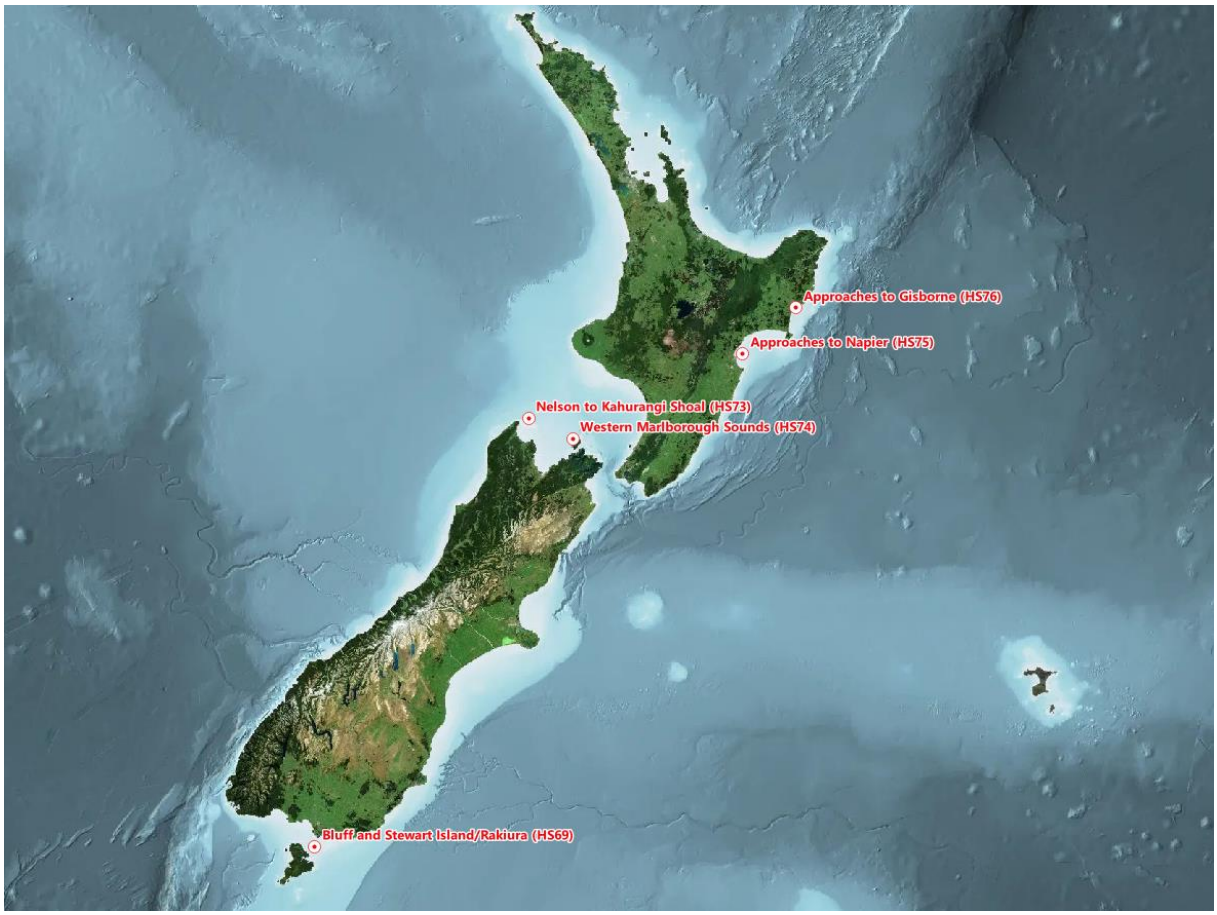
   Detailed information to update IHO Publication P-5 (*Yearbook*) is submitted in Annex A (alternatively, use the online system, reference B). Please indicate "no change" in Annex A if this is the case.

2. Surveys:
   [*Describe any significant developments since the last RHC meeting in surveys related to the items below*]
   a) Coverage of new surveys:
      Surveys completed or in progress since SWPHC19 are listed below:

Survey Number	Area	Completed
HYD-2122-HS69	Bluff and Stewart Island/Rakiura	Jul 2022
HYD-2122-HS73	Nelson to Kahurangi Shoals[1]	In progress

HYD-2122-HS74	Western Marlborough Sounds	In progress
HYD-2223-HS75	Approaches to Napier	Nov 2022
HYD-2223-HS76	Appropaches to Gisborne	In progress

[1] Partnership with Nelson City Council, the Department of Conservation and the Ministry for Primary Industries to collect bathymetry and backscatter data for scientific purposes.



b) New technologies and /or equipment

The annual national civil hydrographic survey programme is delivered through a Supplier Panel established in 2017. The Panel utilise the latest technology for seabed mapping including bathymetry and seafloor / water column backscatter. Technologies include; vessel mounted laser scanner and Remotely Piloted Aircraft Systems (RPAS) to collect data in the intertidal zone (using autonomous systems to avoid hazardous areas); and Uncrewed Surface Vessel (USV) fitted with MBES.

c) New ships

LINZ does not own or operate survey vessels; these are operated by the Supplier Panel.

The Royal New Zealand Navy (RNZN) vessel HMNZS *Manawanui* was commissioned in June 2019. Initial trials included surveying the wreck of MV *Rena* in Tauranga Approaches. The vessel was accepted into Naval Service by mid-2021 and in August was deployed to Tonga to survey the approaches to Nuku'alofa.

d) Crowdsourced and satellite-derived bathymetry - national policy
LINZ has approached suppliers and potential partners to trial CSB activities in NZ waters and beyond. Any trial will align with IHO CSB Guidelines B-12. Information on CSB activities can be found in section 8c.

Working with New Zealand's Ministry of Foreign Affairs & Trade, LINZ has established a Marine Science Research (MSR) Coordinator role to liaise with researchers to facilitate the timely receipt of all reports, data and samples. Copies of all data collected in areas under New Zealand's jurisdiction, or details of where such data can be obtained, are submitted to the Coordinator. All bathymetry data is held by LINZ. The data is being reviewed and assessed before making it discoverable on the LINZ Data Service. Further information is available from https://www.linz.govt.nz/guidance/marine-information/marine-geospatial-information/finding-and-accessing-mgi.

e) Challenges and achievements

Detailed information about surveys to update IHO Publications P-5 (*Yearbook*) and C-55 (*Status of Hydrographic Surveying and Charting Worldwide*) is submitted in Annexes A and B, respectively (alternatively, use the online system, reference B). Please indicate "no change" in Annexes A and B if this is the case.

3. New charts & updates:
New Zealand's first official High Density Electronic Navigational Chart was launched in June 2022, the new high-density chart provides much greater detail than a standard navigational chart. This detail enhances the safety of navigation in confined waters as well as expanding the range of weather and tidal conditions in which safe navigation and vessel berthing may be conducted. The work was recognised by the New Zealand Surveying and Spatial Sciences Institute's Hydrography Excellence Award for 2022 for the 'Next Generation Charting for Napier Port' project.

New Zealand is the Primary Charting Authority (PCA) for five Pacific Island Countries (PIC), as below:

Nation	Paper Charts	ENCs
Cook Islands	3	23
Niue	1	4
Samoa	8	13
Tokelau	1	4
Tonga	12	17

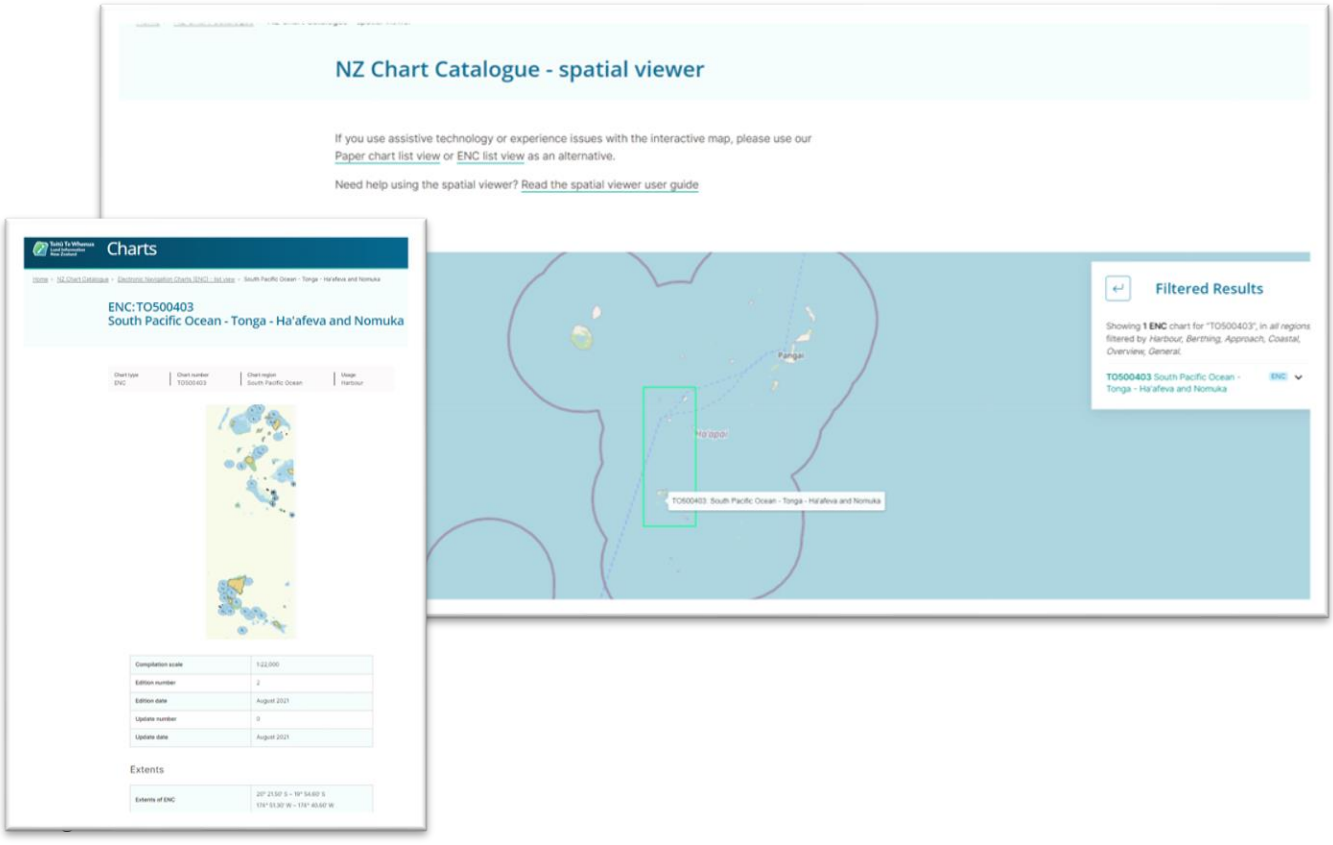
Through the NZ Aid programme, Pacific Regional Navigation Initiative (PRNI), LINZ established a chart improvement programme using new survey data. The table below shows the NC and NE charts and schedule for the remaining charts:

Nation	Paper Charts		ENCs	
	New Edition	New Chart	New Edition	New Chart
Cook Islands	1 (Jan 2019) 2 (Mar 2019)	3 (Feb 2022)	19 (Jun 2017) 3 (Nov 2018) 6 (Jan 2019)	22 (Jan 2022)
Niue	-	1 (Mar 2021)	2 (May 2018)	4 (Apr 2020)
Samoa	4 (Mar 2018) 1 (Jul 2019)	1 (Jan 2022) 1(Oct 2022) 1(Nov 2022) 1 (Feb 2023) 3 (Mar 2023)	1 (Aug 2017) 2 (Oct 2017) 3 (Feb 2018)	1 (Jan 2022) 2 (April 2022) 5 (May 2022) 3 (Feb 2023) 1 (Mar 2023)
Tokelau	1 (Mar 2019)	1 (Feb 2022)	4 (Mar 2019)	4 (Jan 2022)
Tonga	3 (Jan 2019) 2 (Apr 2019) 1 (Jun 2019)	3(Aug 2020) 1(Aug 2020) 2 (Aug 2021) 2 (Mar 2023)	1 (Nov 2018) 3 (Dec 2018) 2 (Feb 2019) 1 (Mar 2019) 1 (Jun 2019) 3 (Aug 2021)	3 (Mar 2020) 1 (May 2020) 2 (Mar 2021) 2 (Jun 2021) 8 (Dec 2021) 2 (Mar 2023)
INT Chart	-	1 (Aug 2019)	-	1 (Jun 2019)

LINZ has rebranded charts (ENC and paper) for the Cook Islands, Niue, Tokelau and Tonga with the two-digit country code. Samoa will be completed by end of March 2023.

a) ENC coverage, gaps and overlaps
To date LINZ has published a total of 331 official New Zealand ENCs and has full ENC coverage of New Zealand waters and area of responsibility.

An on-line spatial viewer provides detailed information of the full New Zealand ENC folio.



b) ENC distribution method

i. LINZ is a member of IC-ENC and distributes all New Zealand ENCs through the regional IC-ENC office.

ii. In July 2020 LINZ launched a local New Zealand ENC distribution service available at https://www.linz.govt.nz/products-services/charts/nz-enc-service. The service is subscription based, providing mariners with access to free and regularly updated ENCs. ENC packages for Antarctica and the Pacific were released late February 2022.

New Zealand ENCs published since the SWPHC19 Meeting			
New Zealand Total: 18 New ENC: 1 NE ENC: 17	South West Pacific Total: 8 New ENC: 8 NE ENC: 0	Antarctica Total: 0 New ENC: 0 NE ENC: 0	INT Total: 0 New ENC: 0 NE ENC: 0

New Zealand ENCs scheduled for publication in 22/23 FY			
New Zealand Total: 17 New ENC: 4 NE ENC: 13	South West Pacific Total: 9 New ENC: 8[1] NE ENC: 1	Antarctica Total: 0 New ENC: 0 NE ENC: 0	INT Total: 0 New ENC: 0 NE ENC: 0

[1] Charts rebranded with country-code.

c) RNCs

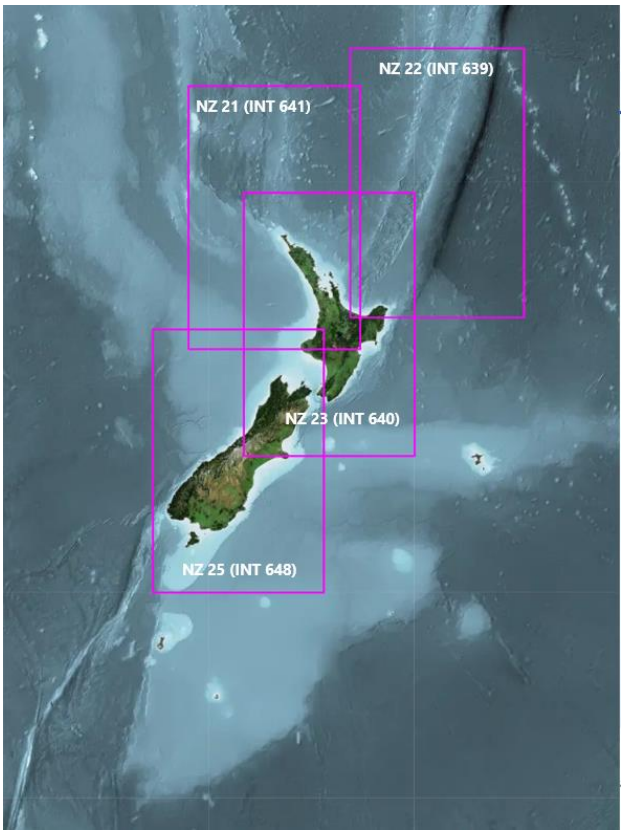
NZ*Mariner* is the product name of New Zealand's Official RNC folio, and is available for download in unencrypted BSB format, at no charge from the LINZ website at https://www.linz.govt.nz/products-services/charts#nzmariner.

d) INT charts

LINZ currently maintains 29 INT charts in Regions L and M.

As part of LINZ's Maritime Digital Transformation Programme, a review of chart scales was undertaken with the aim of standardising them to create a seamless grid scheme and to simplify product creation. The review identified that the 1.5M-scale have limited benefit to mariners and can be safely withdrawn without affecting oceanic route planning or the use of paper charts in oceanic areas. The 3.5M-scale charts have sufficient coverage and information to support overview planning, making the 1.5M-scale charts redundant. As a result, LINZ has been submitted a proposal to the SWPHC International Charting Coordination Working Group (ICCWG) to withdraw four (4) INT paper charts by the end of 2023.

Paper Chart	Title	Scale
NZ 21 (INT 641)	Norfolk Island to Cape Egmont	1:1,500,000
NZ 22 (INT 639)	Kermadec Islands to East Cape	1:1,500,000
NZ 23 (INT 640)	North Island	1:1,500,000
NZ 25 (INT 648)	South Island	1:1,500,000



INT Paper charts proposed to be withdrawn

e) National paper charts
New Zealand has a total of 175 paper charts (excl. INT Charts). Detailed information of the full New Zealand chart folio can be found on the chart catalogue.

New Zealand Paper Charts published since the SWPHC19 Meeting			
New Zealand Total: 11 NC: 0 NE: 11	South West Pacific Total: 5 NC: 5[1] NE: 0	Antarctica Total: 0 NC: 0 NE: 0	INT Total: 0 NC: 0 NE:0

New Zealand Paper Charts scheduled for publication in 22/23 FY			
New Zealand Total: 8 NC: 0 NE: 8	South West Pacific Total: 4 NC: 4[1] NE: 0	Antarctica Total: 0 NC: 0 NE: 0	INT Total:0 NC:0 NE:0

[1] Charts rebranded with country-code.

f) Other charts, e.g. for pleasure craft
Nothing to report (NTR)

g) Create S-10x products to meet future requirements

Maritime Digital Transformation

In response to the new IHO S-100 standard, LINZ (through the NZHA) has established the Maritime Digital Transformation Programme (MDT) to prepare for the future of maritime transport within the realm of New Zealand. The Programme itself spans 10 years aligned to the IHO delivery timeline and will require significant investment and collaboration with other New Zealand agencies, maritime customers as well as other Hydrographic Offices in order to deliver.

For the first of the IHO S-100 Implementation Priorities (Navigational Route Monitoring Mode), LINZ has responsibility in New Zealand for S-101 (Electronic Navigational Charts), S-102 (Bathymetry) and S-104 (Water Level). These products will form the basis of the LINZ minimal viable product, along with the work to streamline/ rationalise existing products and services in preparation for the new products. However, to deliver on the benefits of S-100 through dataset integration, LINZ must partner with other NZ agencies responsible for the other priority datasets.

Activities to date:

- "Call to Action" engagement document developed in 2020, that outlines the case of change and the role of LINZ and other external parties
- An investigation stage (Project Janus Phase 1) has been completed to understand the work required to refactor the Hydrographic Production Database
- MDT project proposal submitted to LINZ senior management

Next steps:

- Develop business case to seek further funding for implementation

- Complete Project Janus Phase 2

S-100

Work continues towards the IHO S-100 implementation decade, with the following now completed:

- First phase of the Technical investigation which focused on assessing the feasibility of the S-100 implementation and S-101 conversion/production
- New Maritime Digital Transformation (MDT) programme was established to prepare for the future
    - Draft Roadmap has now been developed
    - Currently working towards developing a business case to progress this Programme.

Next steps:

- Plan phase 2 of the technical investigation
- Socialize and update MDT Roadmap
- Establish a S-100 stakeholder community in NZ

h) Challenges and achievements

Maritime Digital Transformation challenges

- Securing funding for additional resources to deliver to the S-100 implementation roadmap
- Buy-in from other agencies
- Continue to deliver existing digital and paper charting products whilst commencing the production of the next generation electronic navigational charts (ENCs) from 2026

S-100 challenges:

- Evolving S-101 encoding guidance.
- To meet the needs of mariners while transition the source data into the new scale structure.

Detailed information about charting to update IHO Publications P-5 (*Yearbook*) and C-55 (*Status of Hydrographic Surveying and Charting Worldwide*) is submitted in Annexes A and B, respectively (alternatively, use the online system, reference B). Please indicate "no change" in Annexes A and B if this is the case.

4. New publications & updates:
[*Describe any significant developments since the last SWPHC meeting in nautical publications related to the items below*]

a) New Publications
NTR

b) Updated publications
The New Zealand Nautical Almanac is updated annually and released on 1 July.

c) Means of delivery, e.g. paper, digital
The New Zealand Nautical Almanac is delivered as a hard copy publication and as a

PDF in it's entirety and separate sections, available on-line.

d) Challenges and achievements
As LINZ continues to move to a digital first environment, managing customers expectations about publications is often a challenge, particular any withdrawal of paper products.

In a move to reduce time and effort in the publication of the Nautical Almanac, LINZ has implemented an automation process to produce the List of Lights. Scripts harvest the database for information from AtoN objects.

Detailed information to update IHO Publication P-5 (*Yearbook*) is submitted in Annex A (alternatively, use the online system, reference B). Please indicate "no change" in Annex A if this is the case.

5. MSI
[*Describe the status of Maritime Safety Information (MSI) related to the items below*]

a) Existing infrastructure for MSI dissemination
LINZ publishes Annual Notices to Mariners (available in the Nautical Almanac and online) and fortnightly Notices to Mariners (NtM) distributed via an email subscription service (https://charts.linz.govt.nz/notices-mariners/subscribe) and available online at https://www.linz.govt.nz/products-services/maritime-safety/notices-mariners. The subscription service allows users to select which charts they receive notices for.

A dedicated email address has been established for receipt of information pertinent to NtMs, ntm@linz.govt.nz.

Maritime New Zealand (Maritime NZ) is the NAVAREA XIV Coordinator and the New Zealand National MSI Coordinator rccnz@maritimenz.govt.nz. Navigational warnings are available from the MNZ website https://www.maritimenz.govt.nz/commercial/safety/maritime-radio/navigational-warnings.asp

For further information, refer to NAVAREA XIV Report to SWPHC20.

b) Statistics on work of the National Coordinator
Refer to NAVAREA XIV Report to SWPHC20

c) New infrastructure in accordance with GMDSS Master Plan
Refer to NAVAREA XIV Report to SWPHC20

d) Challenges and achievements
Refer to NAVAREA XIV Report to SWPHC20

Detailed information about MSI to update IHO Publication C-55 (*Status of Hydrographic Surveying and Charting Worldwide*) is submitted in Annex B (alternatively, use the online system, reference B). The national self-assessment of MSI is submitted in Annex C. Please indicate "no change" in Annexes B and C if this is the case.

6. C-55
   The table with the latest information to update IHO Publication C-55 (*Status of Hydrographic Surveying and Charting Worldwide*) is provided in Annex B (alternatively, use the online system, reference B). Please indicate "no change" in Annex B if this is the case.

7. Capacity Building
   [*Describe the need for or ability to offer Capacity Building in relation to the items below*]
   a) Offer of and/or demand for Capacity Building
      In line with Goal 1 of the IHO Strategic Plan 2021-2026, LINZ has initiated a programme of work (Project Janus) to implement and adopt S-100. As a small team, the NZHA will seek CB activities to enable LINZ to meet the Decade of Implementation.

   b) Training received, needed, offered
      A LINZ candidate attended the IHO - Nippon Foundation Geospatial Marine Analysis and Cartography (GEOMAC) Project, held at the UKHO 1 August to 16 December 2022. The the course consists of eight modules including the programme recognized by the FIG-IHO-ICA International Board
   c) on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC)
   d) with Category "B"

      LINZ has challenges in recruiting experienced staff. With few qualified and/or experienced candidates available and two IBSC S-5B (defence & civil) Hydrographic Surveying course in the region, it is generally necessary to recruit from further afield.

   e) Status of national, bilateral, multilateral or regional development projects with a hydrographic component. (In progress, planned, under evaluation or study)
      Since 2015, LINZ and the New Zealand Ministry of Foreign Affairs & Trade (MFAT) have worked on the Pacific Regional Navigation Initiative (PRNI) which focuses on navigation-related aspects of maritime safety. The primary focus for LINZ is on assisting those five Pacific Island Countries (PICs) where New Zealand is the Primary Charting Authority (PCA), namely Cook Islands, Niue, Samoa, Tonga and Tokelau.

      To-date:
      - Hydrography Risk Assessments for Cook Islands, Niue, Samoa and Tonga have been completed, presented to the respective governments and are available on the LINZ website;
      - an analysis of vessel traffic in and around Tokelau has been completed, used by SPC as the basis of their Safety-of-Navigation programme and is available on the LINZ website;
      - bilateral arrangements with the Cook Islands, Niue, Samoa and Tonga have been signed;
      - hydrographic survey work in the Cook Islands, Niue, Samoa, Tokelau and Tonga has been completed including; Satellite Derived Bathymetry (SDB) over nine islands of the Cook Islands, throughout Tonga and Beveridge Reef in Niue; Airborne Laser Bathymetry (ALB) in Tonga and Niue; and Multibeam echo sounder (MBES) survey in Tonga and Samoa;
      - survey data delivered to Tonga, Niue and Samoa;

- chart improvement programmes for the Cook Islands, Niue, Samoa, Tokelau and Tonga have been progressed. Updated ENCs and paper charts have been published incorporating new hydrographic survey data. All new charts have been re-branded with the country's two-letter code.

The focus for the past 12 months has been improving the charts for Samoa, in particular, withdrawing all charts on undetermined datums and in fathoms and rebranding the charts with the two-letter country code. This will complete the programme of chart improvements through PRNI.

8. Oceanographic activities
[*Describe any significant developments in oceanographic activity since the last SWPHC meeting related to the items below*]

a) General
Within New Zealand there are two Crown Research Institutes (CRI) involved in oceanographic studies: NIWA, the National Institute of Water and Atmospheric http://www.niwa.co.nz/ and GNS Science http://www.gns.cri.nz/.

Both operate data portals allowing users to discover and access a wide range of New Zealand marine geospatial data.
- GNS: https://data.gns.cri.nz/tez/
- NIWA: https://niwa.co.nz/

New Zealand operates an Ocean Data Network data portal (https://nzodn.nz/), a node of the Australian Ocean Data Network (AODN https://portal.aodn.org.au/).

NIWA vessels (RV *Tangaroa* and RV *Kaharoa*) undertook a number of oceanographic voyages over the last 12 months. These include: a deployment and maintenance of DART tsunami sensors of Tonga and Nuie; paleo-tsunami studies in the Tasman Sea; deployments of CTD sensors off the Kermadec Ridge and the west coast of the South Island; and 38 days deploying ARGO floats in the Pacific Ocean and Tasman Sea.

A key expedition was the NIWA-Nippon Foundation Tonga Eruption Seabed Mapping Project (TESMaP) in response to the massive January 15th eruption of the Hunga Tonga-Hunga Ha'apai volcano in Tonga. This expedition consisted of a 28-day voyage on the RV *Tangaroa* looking at the bathymetry, oceanographic, and biological effects of the eruption; and a 30-day voyage of the uncrewed surface vessel USV Maxlimer which undertook bathymetric and oceanography studies in the cladera (crater) of the Hunga Volcano.

b) GEBCO & Seabed 2030
GEBCO's current gridded bathymetric data set, the GEBCO_2022 Grid, is a global terrain model for ocean and land, providing elevation data, in metres, on a 15 arc-second interval grid. It is accompanied by a Type Identifier (TID) Grid that gives information on the types of source data that the GEBCO_2022 Grid is based on.

New Zealand is the Seabed 2030 Regional Data Assembly and Coordination Center (RDACC) for the South and West Pacific Ocean and operates the South and West Pacific Data Center (SaWPac). The SaWPac is run jointly by NIWA/GNS/LINZ and is

hosted by NIWA. The latest data delivery from the SaWPac was undertaken late-January 2023. This contributes to the Seabed 2030 project release of the GEBCO grid in 2023.

The Third SaWPac Regional Mapping Workshop was held again on-line 2-4 July 2022. Fifty-four participants from 18 countries and/or institutes attended the workshop. The next SaWPac Regional Mapping Workshop is planned as a hybrid in-person/virtual event to be hosted by the Peruvian Navy in Lima, Peru for 12-14 July 2023. Representatives from countries in the South and West Pacific are encouraged to contribute bathymetry data from their area to the Seabed 2030 project.

c) Crowdsourced Bathymetry Activities

Data loggers were successfully installed and used on six vessels of varying size and deployed around offshore islands in New Zealand waters in late-2021. The data from these loggers are now at SaWPac and currently in the process of being quality checked and then passed on the to IHO CSB Trusted Node at the Seabed 2030 Global Center. Data loggers are also currently installed on some of NIWA's small vessels, a vessel from the New Zealand Department of Conversation and plans are underway to deploy data loggers on some of the New Zealand Coastguard fleet.

Two data loggers have just been sent to Kiribati for installation on local vessels.

Investigations are underweay with the University of Otago to install data loggers on board the School of Surveying's boats.

There is an active project to deploy 50 data loggers in Palau. NGA has been assisting with the installation of the loggers onto vessels.

NZ is actively investigating other CSB opportunities and supporting regional projects through SaWPac and encourage any organisation or vessel wishing to participate to contact the SWPHC CSB/Seabed 2030 Coordinator.

d) Sea level gauge network

LINZ publishes tide predictions for Standard and Secondary Ports on the web https://www.linz.govt.nz/products-services/tides-and-tidal-streams/tide-predictions.

LINZ, in partnership with GNS Science, has established a network of 18 sea level gauges to improve New Zealand's response to tsunami hazards. Further information is available at https://www.linz.govt.nz/products-services/data/types-linz-data/sea-level-data/sea-level-data-downloads.

Through the **Joining Land & Sea (JLAS) Project**, LINZ is collecting sea level data and completing tide gauge calibrations at 89 'coastal link' sites around New Zealand. This data will be used, initially, to constrain and calibrate a new tide model developed by NIWA for New Zealand's EEZ. This will provide the tidal surfaces for the JLAS prototype tool to seamlessly connect land and sea datasets. The data collection involves establishing tide stations for a minimum of 35 days (often at sites where sea level observations have never been made before), calibrating existing tide gauges and

surveying ellipsoidal heights on benchmarks that are connected to the sea level data.

e) New equipment
A network of 12 DART buoys (Deep-ocean Assessment and Reporting of Tsunamis) has been established around New Zealand at strategic locations in the Southwest Pacific close to the Hikurangi, Kermadec, Tonga and Vanuatu trenches, and northwest of Norfolk Island. This network installation was led by NEMA (National Emergency Management Agency) in partnership with GNS Science and NIWA with funding provided by MBIE (Ministry for Business, Innovation and Employment) and MFAT (Ministry for Foreign Affairs and Trade). More info is available at:
https://www.geonet.org.nz/tsunami/dart
https://niwa.co.nz/news/a-job-for-the-buoys

f) Challenges and achievements
JLAS Project. Since 2018, 73 coastal link sites have been installed and calibrated by two contractors, Ocean Infinity (Australia) Pty Ltd (formerly iXblue Pty Ltd) and Southern Hydrographic Limited, with another four in progress.

9. Spatial data infrastructures
a) Status of MSDI
LINZ approach to SDI is in line with the UN-GGIM Integrated Geospatial Information Framework (IGIF). Rather than developing one single system, the NZ preference is to follow an integrated approach based on FAIR data principles (findable, accessible, interoperable and reusable), common standards and interoperability.

LINZ continues to lead the NZ Marine Geospatial Information Working Group (NZMGI-WG) to encourage improved access and reuse of MGI. There are several data portals within NZ which host and serve MGI. The NZ MGI WG has published details of portals containing NZ MGI on the LINZ website.

b) Relationship with the NSDI
The LINZ Data Service provides free online access to LINZ's most up-to-date land and seabed data. Users are able to discover, view and access to hydrographic and topographic data.

The LINZ JLAS project will enable data from terrestrial and marine environments to be more easily integrated, for seamless mapping across land/sea interfaces.

c) Involvement in regional or global MSDI efforts
LINZ regional involvement through:
   i. SWPHC MSDI WG
   ii. AusSeabed
   iii. GEBCO Seabed 2030 South and West Pacific Ocean Regional Centre

LINZ global involvement through:
   i. IHO MSDI WG
   ii. OGC Marine Domain WG
   iii. UNGGIM Marine Geospatial WG

d) National implementation of the UN Statement of Shared Guiding Principles for Geospatial Information Management – including any national data policy and impact on marine data. Ref: IHO Strategic Plan, Goal 2, Target 2.3, SPI 2.3.1 Number of HOs reporting success applying the principles in their national contexts.

The recently establish NZ Oceans and Fisheries portfolio work programe has identified longer term work to include; development of a marine spatial planning framework, and effective use of data, including improving data consitancy, accuracy and availability.

e) MSDI national portal
New Zealand does not have a single MSDI portal. Several data portals that host NZ MGI were identified as part of the data portal study and their characteristics are described on the MGI webpage.

f) Best practices and lessons learned
LINZ is improving its foundational capabilities in the management, storage, interoperability and sharing of geospatial data to better prepare for our digital future.

g) Challenges and achievements
Key achievements for the NZ MGI WG this year include:

- Digital Government Partnership fund- Four government agencies (LINZ, Department of Conservation, Ministry of Primary Industries, and Te Arawhiti / Crown Māori Relations) collaborated to test the value of a cloud-based datamesh technology in enabling access, integraton and analysis of marine spatial data, stored in different places and formats. The findings from this work will be used to support a case for investment in access and reuse of marine spatial data.
- Support for an integrated approach to marine data management and national leadership from stakeholders across the wider system.

Key challenges:

- Lack of committed funding and resources.

10. Innovation

a) Use of new technologies
The NZ long-term national civil hydrographic programme (HYPLAN), utilises new technologies, including vessel mounted mobile laser scanners to map the coastline; Unmanned Surface Vessels (USV); and Unmanned Aerial Vehicles (UAV) to identify hazards close inshore to mitigate health and safety risks.

LINZ has recently moved all its hydrographic survey data holdings to a cloud environment. This is to facilitate ease of transferring large data volumes and future plans to run data validation applications in the cloud.

NZ WGI WG Digital Government Partnership - Marine Data Innovation project has two parts:
Objective 1: test the value of a datamesh technology in enabling integrated marine management by:

- improving access to marine data held on various data platforms, and in various formats and standards, through a central map interface,
- enabling participatory analysis via open and shared tools so decisions can be collaborative and transparent,
- identifying technical requirements to improve marine geospatial management access and reuse.

A report can be found here https://www.linz.govt.nz/resources/research/enabling-integrated-marine-management.

Objective 2: engage with kaitiaki o te moana to embrace te ao Māori worldviews in relation to marine geospatial data and to enable improved integrated marine management by:

- building strong and enduring relationships between marine data holders including Iwi/Māori and Hapū marine data interest groups;
- identifying the challenges and opportunities for Iwi/Māori and Hapū in accessing and using marine geospatial data; and,
- recommending a te ao Māori approach to marine geospatial data management, access and reuse by Kaitiaki o te Moana.

b) Risk assessment
All risk assessment reports completed by LINZ are available here.

c) Policy matters
The NZHA has been engaged with NZ MFAT to review options for future work in the region in accordance with the NZ Pacific Reset and NZ policy statement

11. Other activities
[*Describe any other significant developments of interest to the SWPHC since the last meeting related to the items below*]
a) Participation in IHO meetings

IHO meetings since SWPHC19	**Date**
CSBWG12	March 2022
IBSC45	March/April 2022
IRCC 2nd Workshop on the IHO Strategic Plan	April 2022
IBSC45	April 2022
MSDIWG13	May 2022
IRCC14	June 2022
6th Council Meeting (C6)	October 2022
ENCWG7/S-101PT9	November 2022
NCWG8	November 2022

Future activities include:	
3rd Assembly	May 2023
IBSC46	May 2023
IRCC15	June 2023
7th Council Meeting (C7)	October 2023

MSDIWG14	January/February 2023
ENCWG8/S-101PT11	TBC

b) Meteorological data collection
New Zealand, through its National Meteorological Service, collects surface meteorological data as part of our international obligations to the Global Ocean Observing System operated by the Joint IOC/WMO Technical commission for Oceanography and Marine Meteorology.

A fleet of approximately 15 volunteer observer ships (reduced from 30 as a result of COVID and changes in charters) and 25 drifting meteorological buoys (an increase of 5) are utilised, and the data is disseminated through the WMO Global Telecommunications System for use in weather forecasting and climate studies.

c) Geospatial studies
Refer to section 9.

d) Preparation for responses to disasters
LINZ has an active role in co-ordinating and promoting the use of geographic data to support New Zealand to prepare for and respond to emergencies and climate change events. https://www.linz.govt.nz/products-services/data/types-linz-data/resilience-and-climate-change.

On 15 January 2022, the underwater volcano Hunga Tonga Hunga Ha'apai erupted violently and caused a tsunami that resulted in significant damage to multiple islands in the Kingdom of Tonga. The New Zealand Defence Force (NZDF) mobilised a large Humanitarian Aid / Disaster Relief task group in response – including Hydrographic Surveyors from the littoral warfare unit HMNZS *Matataua*. The surveyors were embarked in HMNZS *Wellington* which deployed at short notice to provide reconnaissance before the main effort arrived in the form of *Canterbury* and *Aotearoa* delivering water, aid supplies and fuel. The task force also worked with other nations to coordinate HADR effects as they arrived on scene. Strict COVID control measures were followed throughout the operation with all tasks conducted in a contactless manner.

e) Environmental protection
NTR

f) Engagement with the Maritime Administration.
We are working with MNZ to plan for the implementation of the S-100 Ecosystem in New Zealand, i.e., the IMO SOLAS S-100 ECDIS performance standards (2026 & 2029) and the IHO Roadmap for the S-100 Implementation Decade (2020-2030). We are focused on the delivery of the S-100 priority products for ECDIS Route Monitoring mode and the impact of these new products and services on our customers, stakeholders and maritime regulations. As we sunset traditional paper charts we need to focus on the implications for the future as we shift to digital charting for both the SOLAS ECDIS and sub-ECDIS community.

In September 2022 the IMO conducted an audit in accordance with resolution A.1067(28) on Framework and Procedures for the IMO Member State Audit Scheme and resolution A.1070(28) on IMO Instruments Implementation (III) Code. There were a number of areas of good practices revealed, as well as areas where improvements were possible. The final report is expected Q1 2023 and LINZ and MNZ will work together to develop an action plan to respond to the findings.

g) Aids to Navigation matters
Maritime NZ are the authority responsible for Aids to Navigation in NZ.

h) Magnetic and gravity surveys
NTR

i) International engagements

Meetings & conferences since SWPHC19	
Australasian Coasts & Ports	April 2022
5th SWPHC MSDIWG	May 2022
SWPHC Seabed 2030 Webinar #1	May 2022
SWPHC Seabed 2030 Webinar #2	June 2022
Hydrographic Community Briefing	June 2022
SWPHC Seabed 2030 Webinar #3	June 2022
UN-GGIM PGSC Regional Workshop on Strengthening National Geospatial Information Management	June 2022
SWPHC Seabed 2030 Webinar #4	July 2022
Seabed 2030 SaWPac Regional Mapping Community Meeting	July 2022
6th SWPHC MSDIWG	August 2022
SWPHC S-100 Workshop #2	October 2022
7th SWPHC MSDIWG	October 2022
Pacific Regional Maritime Transport Officials Meeting*	November 2022

Future activities include:	
Pacific Regional Maritime Transport Officials Meeting	May 2023
Fifth Pacific Regional Energy and Transport Ministers' Meeting	May 2023
IC-ENC Technical Conference	March 2022

* AU and NZ presented a SWPHC paper on The International Hydrographic Organization (IHO) Strategic Plan 2021-2026 and the South West Pacific Hydrographic Commission (SWPHC) Work Plan to the Pacific Regional Maritime Transport Officials Meeting, held online 15-16 and 18 November 2022. The meeting was attended by representatives from governments and administrations across the South West Pacific, and international and regional development partners, including ADB, IALA, IMO and WB. The paper is available on SWPHC webpage (https://iho.int/en/events-recordings).

The meeting was an opportunity for the SWPHC to provide information on the International Hydrographic Organization (IHO) Strategic Plan 2021-2026 and the South West Pacific Hydrographic Commission (SWPHC) Work Plan related to the Officials' Priorities. These relate to:

- Priority 1 - maritime governance and implementation of a community-based approach for "safety for all at sea" in the Pacific
- Priority 3 - resourcing Navigation Safety services and delivery
- Priority 4 - enhancing gender equality in the maritime sector
- Priority 5 - adopting a vision for resilient, green and clean ports
- Priority 6 - advancing programmes for the reduction of the GHG emissions in the region
- Priority 8 - enhancing collaboration and coordination in the Pacific, through IMO activities and initiatives

The papers' recommendations were:

- Engage and collaborate with IHO, IMO, IALA and regional partners to deliver as one the delivery of future Safety of Navigation services in the Pacific region.
- Note the IHO Strategic Plan and the SWPHC Work Plan and support the activities through the coastal States' hydrographic office and/or competent maritime authority. In particular:
    - Preparing Coastal Sates in the Pacific Region for Maritime Digital Transformation –Supporting hydrographic governance in Pacific Island Countries and Territories and the introduction of Next Generation Charting Products & Sunsetting of Traditional Paper Chart
- Engage with the IHO and SWPHC to fully understand the benefits and value of hydrography and the importance of including hydrography when designing development programs.
- Encourage regional and international agencies, development partners and coastal States to adopt and implement open data policies in line with the UN-GGIM Statement of Shared Guiding Principles for Geospatial Information Management and the UN-GGIM Integrated Geospatial Information Framework (IGIF) Strategic Pathway 2: Policy and Legal.

12. Conclusions

[*Provide a short summary statement that highlights any of the following:*

a) Areas of significant achievement

NZ MGI WG:

- Digital Government Partnership fund- Four government agencies tested the value of a cloud-based datamesh technology in enabling access, integraton and analysis of marine spatial data, stored in different places and formats. A report of the strategic findings and recommendations are available online.

S-100:

- The NZHA has continued to make significant steps towards a digital first, data centric environment. In particular, there has been a focus on the implementation of the new S-100 standard with an investigation into creating a S-100 database from the current S-57 objects.

Survey & Charting:

- 10 ENCs and 3 paper charts published for the Samoa and Tonga rebranded with the country's two-letter country code i.e., Samoa WS.
- First official high density ENC (hdENC) published June 2022 for Port of Napier. The project received the Hydrography Excellence Award for 2022 from the NZ Surveying & Spatial Sciences Institute
- All fathom and non-WGS84 charts for Tonga and Samoa withdrawn and replaced with modern, metric charts.
- The New Zealand Defence Force (NZDF) mobilised a large Humanitarian Aid / Disaster Relief task group to Tonga in response the underwater volcano Hunga Tonga Hunga Ha'apai eruption and subsequent tsunami. Hydrographic Surveyors from the littoral warfare unit conducted surveys on the main navigation channel and wharves at Nuku'alofa.
- The NIWA-Nippon Foundation Tonga Eruption Seabed Mapping Project (TESMaP) was carried out in response to the January 15th eruption of the Hunga Tonga-Hunga Ha'apai volcano in Tonga. This expedition mapped the seafloor and recorded the effects of the eruption on the seafloor. This was followed with further mapping over the caldera of the volcano with the uncrewed surface vessel USV Maxlimer.

Regional activities:

- AU and NZ presented a SWPHC paper on the IHO Strategic Plan and the SWPHC Work Plan to the Pacific Regional Maritime Transport Officials Meeting, held online 15-16 and 18 November 2022.

b) Areas of particular concern

- **Maritime Digital Transformation**
  - Secure funding for resources to deliver to S-100 implementation roadmap
  - Deliver existing digital and paper charting products whilst commencing the production of the next generation electronic navigational charts
- Meeting the needs of mariners while transitioning source database to S-100
- Recruitment and retention of staff
- Capacity Building for S-100

c) *Any other matters of interest to the SWPHC*

- Proposal to withdraw four (4) INT paper charts submitted to SWPHC ICCWG
- IMO audit undertaken September 2022. There were a number of areas of good practices revealed, as well as areas where improvements were possible. The final report is expected Q1 2023 and LINZ and MNZ will work together to develop an action plan to respond to the findings.

Input to the IHO Publication P-5 (*Yearbook*)

Country: New Zealand
Organization: Toitū Te Whenua Land Information New Zealand

(Please provide the information in English. Consider using the IHO Online Form System, see reference B)

Contact information/ Informations de contact / Información de contacto	
-National Hydrographer or equivalent -Directeur du service hydrographique ou équivalent -Director del Servicio Hidrográfico o equivalente	No change
-Head of the Hydrographic Office (if different from the person indicated above) -Directeur du Service Hydrographique (si différent de la personne indiquée ci-dessus) -Director del Servicio Hidrográfico (si diferente de la persona indicada anteriormente)	No change
-Other point(s) of contact -Autre(s) point(s) de contact -Otros punto(s) de contacto	
-Web site -site web -sitio web	https://www.linz.govt.nz/
Country information / Informations sur le pays/ Información sobre el país	
-Declared National Tonnage -Tonnage national déclaré -Tonelaje Nacional Declarado	Tonnage: 281,531 Date: 21/12/2022
-National day -Fête nationale -Fiesta nacional	6th February. *Waitangi Day*
-Date of establishment and Relevant National Legislation -Date de mise en place et législation nationale	No change

pertinente -Fecha de constitución y legislación nacional pertinente	
-Date first joined IHO -Date d'adhésion à l'OHI -Fecha de adhesión a la OHI	No change
-Date ratification Convention -Date de ratification de la Convention -Fecha de ratificación de la Convención	No change
-Remarks on membership -Remarques sur l'adhésion -Comentarios sobre la adhesión	No change
Agency information/ Information sur l'agence/ Información sobre la agencia	
-Top level parent organisation -Organisme mère -Organización asocieda de nivel superior	No change
-Principal functions of the organisation or the department -Attribution principales de l'organisme ou du département -Principales funciones de la Organización o departamento	No change
-Annual operating budget -Budget annuel -presupuesto anual	
-Total number of staff employed -Effectifs totaux -Número total de personal empleado	812 (LINZ), 18 NZ Hydrographic Authority
-Number of INT charts published -Nombres de cartes INT publiées -Número de cartas INT publicadas	29

-Total number of paper charts published-Nombre total de cartes papier publiées-Número total de cartas de papel publicadas	175			
-Number of ENC cells published -Nombres de cellules ENC publiées -Número de células ENC publicadas	331			
-Number of Other charts -Nombre d'Autres cartes -Número de Otras cartas	NA			
-Type of publications produced -Type d'ouvrages produits -Tipo de publicaciones producidas	No change			
-Detail of surveying vessels/ aircraft -Détail des bâtiments hydrographiques / aéronefs -Detalle de los buques hidrográficos / aeronaves	-Name -Nom -Nombre	-Displacement -Déplacement -Desplazamiento	-Date Launched -Date de mise en service -Fecha de botado	-Number of crew -Nombre de l'équipage -Tripulación
-Other information of interest -Autres informations utiles -Otra información de interés				

Input to the IHO Publication C-55 (*Status of Hydrographic Surveying and Charting Worldwide*)
Country: New Zealand
(Please provide the information in English. Consider using the IHO Online Form System, see reference B)

C-55 Summary for:				**Comments on Charts:**
Country:	New Zealand			
Country Iso Code:	NZ			
Country SubCode:				
INT Region:	L			
Country/Depend:	C			
Last updated:	Feb 2021			
Provided by:	LINZ			
Chart coverage	**Passage (%)**	**Coastal (%)**	**Port (%)**	
INT	100	100	0	**Comments on Surveys:** Hydrographic surveys carried out in: Banks Peninsula, Bluff & Stewart Island, Napier Approaches and Tasman region
RNC	100	100	100	
ENC	100	100	100	
Status of Paper Charts				
Paper charts with depths in meters (%)			100	
Paper charts referenced to a satellite datum (%)			100	
Status of surveys	**Adequate (%)**	**Resurvey (%)**	**No survey (%)**	
0-200m	79	21	0	
> 200m	3	9	87	

MSI	**Y/N**	**Comments on MSI:**
Local warning	Y	Promulgated by harbour masters
Coastal warning	Y	Promulgated by National Coordinator, NZ Rescue Coordination Center, Maritime NZ (MNZ)
Nav warning	Y	NAVAREA XIV Coordinator
Port warning	Y	
GMDSS	**Y/N**	**Comments on GMDSS:**
Master Plan	Y	Coordinated by Maritime NZ
Area A1	N	
Area A2	N	
Area A3	Y	
NAVTEX	N	
SafetyNet	Y	NAVAREA XIV messages broadcast via SafetyNET. Note MSI also promulgated via Iridium SafetyCast.

National MSI Self-Assessment

Country: New Zealand
Organization: Maritime New Zealand

Refer to NAVAREA XIV Report to SWPHC20