18TH MEETING OF THE SOUTH WEST PACIFIC HYDROGRAPHIC COMMISSION (SWPHC18)
VTC, 17-19 February 2021

NATIONAL REPORT FROM NEW ZEALAND TO THE SWPHC18

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

Executive summary

1. Hydrographic Office / Service:
   a) Name of the institution: Land Information New Zealand (LINZ)
   b) Description: The National Hydrographer (Adam Greenland) and Group Manager Hydrography (Rebecca McAtamney) lead the New Zealand Hydrographic Authority (NZHA) in partnership. Both positions report to the Deputy Chief Executive Location Information, Jan Pierce.

      The NZHA comprises 19 personnel, including three hydrographic surveyors, five nautical cartographers, two marine geospatial data specialists and a Technical Change Leader who leads a programme of work to 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 SWPHC17 are listed below:

Survey Number	Area	Completed
HYD-1819-HS66	Western Marlborough Sounds[1]	Jun 2020
HYD-1819-HS71	Coromandel	Oct 2020
HYD-1819-HS72	Taranaki	Feb 2021

[1] Partnership with Marlborough District Council 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 Unmanned Aerial Vehicles (UAV) to collect data in the intertidal zone (using autonomous systems to avoid hazardous areas); and Unmanned Surface Vessel (USV) fitted with MBES.

In June 2020 an investigation was carried out into the use of UAVs and Structure from Motion to map small inter-tidal areas to a depth of approximately 3m. Future investigations will include UAV fitted with a bathymetric LiDAR sensor.

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. The vessel is expected to be available for deployment in Q3 2021 in NZ and the SWP region.

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.

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. To-date, 240Gb of bathymetry data (zipped) from 26 voyages has been downloaded and LINZ is the process of reviewing and assessing the data before making it discoverable on the LINZ Data Service. Further information is available from https://www.linz.govt.nz/sea/marine-geospatial-information.

e) Challenges and achievements
Travel restrictions during the COVID-19 pandemic impacted survey planning and operations, requiring reprioritisation at short notice. Flexibility and agility by all survey teams did not unduly impact delivery of hydrographic and scientific services through the period of severe COVID.

In June 2020 a new version of HYSPEC was published. Based on IHO S-44, this version reflects the changes in technology and methodology for the collection, processing and delivery of digital marine geospatial data and information. The document makes provision for bathymetric LiDAR and Satellite Derived Bathymetry.

In March 2020 an investigation into 3D Coastal Mapping around the NZ coast was completed. A number of recommendations were made, including the use of combined topographic / bathymetric LiDAR. Specifications were developed based on the NZ National Aerial LiDAR Base Specification. A budget proposal to carry out the 3D Coastal Mapping project was submitted, but reprioritisation of government funding to national 'shovel ready' projects in the post-COVID environment, meant funding was unavailable. However, the business case has been developed and LINZ is investigating options.

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:
[*Describe any significant developments since the last RHC meeting in charting related to the items below*]

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

Nation	Paper Charts	ENCs	Fathoms/non-WGS84
Cook Islands	3	23	0
Niue	1	4	0
Samoa	7	7	2
Tokelau	1	4	0
Tonga	14	15	4

The LINZ PRNI NZ Aid programme has established a chart improvement programme using new survey data. The table below shows the NC and NE charts and the schedule for the remaining charts:

Nation	Paper Charts		ENCs	
	New Edition	New Chart	New Edition	New Chart
Cook Islands	1 (Jun 2018) 2 (Feb 2019)	-	19 (Jun 2018) 3 (Nov 2018) 6 (Jan 2019)	-
Niue	-	1 (Mar 2021)	2 (May 2018)	2 (Apr 2020)
Samoa	4 (Mar 2018) 1 (Jul 2019) 2 (Jun 2022)	4 (Jun 2022)*	4 (Jun 2022)	7 (Jun 2022)*
Tokelau	1 (Mar 2019)	-	4 (Mar 2019)	-
Tonga	3 (Jan 2019) 2 (Apr 2019) 1 (May 2019)	4 (Jun 2020)* 1 (Jun 2021) 2 (Jun 2022)	1 (Nov 2018) 3 (Dec 2018) 2 (Feb 2019) 1 (Mar 2019) 1 (Jun 2019)	3 (Mar 2020) 1 (May 2020) 2 (Mar 2021)* 2 (Jun 2021)
INT Chart	-	1 (Aug 2019)	-	1 (Jun 2019)

* New Charts to replace current fathoms/non-WGS84 charts.

LINZ has commenced a programme to rebrand charts (ENC and paper) for the above five PICs by including the two-digit country code. To-date six Tonga (TO) ENCs, four paper charts and four Niue (NU) ENCs and have been published, replacing previous NZ prefixed charts.

a) ENC coverage, gaps and overlaps
To date LINZ has published a total of 326 official New Zealand ENCs and has

achieved 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.

High density ENC (hdENC)

In October 2018 'Navigation in pilotage waters' was added on New Zealand's Transport Accident Investigation Commission's watch-list (TAIC, 2018). This situation has arisen as a result of several recent incident investigations that identified the bridge resource management did not meet international standards. Miscommunication and a lack of common understanding among the bridge management team were recurring factors of these incidents. In November 2018, the pilotage community discussed how hdENCs could help achieve a shared mental model among the bridge management team.

Since 2018 LINZ has worked with Napier Port to develop a prototype hdENC. The aim is to accurately define areas which need to be avoided when approaching the harbour and also improve the use of available manoeuvring space. With further major port developments underway, the publication of an official hdENC is on hold. However, LINZ has developed a process for ports to request an official hdENC, which will be available March 2021.

An article on a practical approach to the production of ENC with high density bathymetric content was published in the International Hydrographic Review, November 2019. A. Sanchez, V. Bosselmann-Borsos and A. Di Lieto, International Hydrographic Review, https://iho.int/uploads/user/pubs/ihreview_P1/IHR_Nov2019.pdf

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/sea/charts/nz-enc-service. The service is subscription based, providing mariners with access to free and regularly updated ENCs.

New Zealand ENCs published since the SWPHC17 Meeting			
New Zealand Total: 39 New ENC: 0 NE ENC: 39	South West Pacific Total: 14 New ENC: 10 NE ENC: 4	Antarctica Total: 0 New ENC: 0 NE ENC: 0	INT Total: 0 New ENC: 0 NE ENC: 1

New Zealand ENCs scheduled for publication in 20/21 FY			
New Zealand Total: 18 New ENC: 0 NE ENC: 18	South West Pacific Total: 4* New ENC: 4 NE ENC: 0	Antarctica Total: 0 New ENC: 0 NE ENC: 0	INT Total: 0 New ENC: 0 NE ENC: 0

* 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/sea/charts/information-about-charts#nzmariner.

NZ*Mariner* is a legacy product and will be withdrawn by 1 July 2021.

d) INT charts
LINZ maintains 30 INT charts in Regions L and M.

e) National paper charts
New Zealand has a total of 197 paper charts. Detailed information of the full New Zealand chart folio can be found on the on-line spatial viewer.

New Zealand Paper Charts published since the SWPHC17 Meeting			
New Zealand Total: 15 NC: 0 NE: 15	South West Pacific Total: 4 NC: 4 NE: 0	Antarctica Total: 0 NC: 0 NE: 0	INT Total: 0 NC: 0 NE:0

New Zealand Paper Charts scheduled for publication in 20/21 FY			
New Zealand Total: 9 NC: 0 NE: 9	South West Pacific Total: 3* NC: 3 NE: 0	Antarctica Total: 0 NC: 0 NE: 0	INT Total:0 NC:0 NE:0

* Charts rebranded with country-code

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

g) Challenges and achievements
Between March and June 2020 all LINZ staff were required to work from home due to nationwide restrictions resulting from the COVID-19 pandemic. IT systems were in place to enable work to continue under these conditions. However, outsourced charting work from an overseas company was impacted as they responded to the pandemic.

In July 2020 LINZ launched the NZ ENC Service, a subscription-based service providing mariners with access to free and regularly updated electronic navigational charts.

LINZ is reviewing the future of the paper chart product and discussing the implications for carriage requirements with Maritime NZ.

h) Create S-10x products to meet future requirements
In 2010 LINZ implement the Hydrographic Production Database (HPD) software suite. The hydrographic information is stored in S-57 data format and, like many hydrographic offices, was captured from the paper chart folio. It has multiple scale

layers to allow for the creation of current paper and ENC products.

The database was designed with a paper chart centric focus and LINZ still produce and maintain products from this legacy viewpoint. With the IHOs drive to implement S-100, LINZ has instigated a programme of work - Project Janus. This will enable LINZ to implement and adopt the S-100 Universal Hydrographic Data Model, preparing NZ for e-Navigation. Further information is contained in the document *Preparing New Zealand for e-Navigation September 2020 - Implementation and Adoption of the S-100 UNIVERSAL HYDROGRAPHIC DATA MODEL – Sep 2020*.

LINZ will:

i. Create a new source database structure which is product neutral to support the production of gridded ENCs and minimise data duplication.
ii. Improve chart schemes for ENCs and Paper Charts to easily maintain future products
iii. Develop standardised scales for ENCs and Paper Charts to harmonise product creation
iv. Withdraw surplus Paper Charts
v. Use scale-less usages to their full potential to improve data management by using the approach ‘create once use many times’
vi. Establish processes and systems to support the creation of S-101 next generation gridded ENCs

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
LINZ is currently reviewing changes to the New Zealand Nautical Almanac, in particular, list of lights and astronomical information.

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.

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 (http://www.linz.govt.nz/sea/maritime-safety/notices-mariners/subscribe-fortnightly-edition-notices-mariners) and available online at http://www.linz.govt.nz/sea/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

See the following NAVAREA XIV reports:
- The MSI Self-Assessment report for NAVAREA XIV for the period July 2019 to June 2020 was submitted to the IHO World-Wide Navigational Warning Service (WWNWS) Sub-Committee Meeting (WWNWS12) held online from 1 to 3 September 2020.
- NAVAREA XIV Report to SWPHC18 and National MSI Coordinators self-assessments.

In an effort to improve communications and ensure contact details are correct, the NAVAREA XIV Coordinator conducts six monthly communications checks with nine National Coordinators. Since inception the response rate has been 100%.

b) Statistics on work of the National Coordinator

MSI received from Coastal States within NAVAREA XIV

Coastal State/Country	**Number of MSI messages**	**Topics/Subjects of messages**	**IHO CB Funded MSI Courses Attended**
Cook Islands	2	AtoNs	2010, 2014, 2016, 2018
Fiji	36	AtoNs, Cable laying ops, Pipeline installations, Wrecks, Tropical cyclone damage	2010, 2014, 2016, 2018
French Polynesia	60	Military exercises, Space debris, Drifting hazards, AtoNs, COVID restrictions	2010, 2014, 2016, 2018
Kiribati	1	AtoN correspondence	2016, 2018

New Caledonia	20	Military exercises, Drifting hazard, COVID restrictions	2010, 2014, 2016, 2018
Niue	4	AtoNs, COVID restrictions	2016, 2018
Samoa	8	AtoNs, Wrecks, COVID restrictions	2016, 2018
Tonga	18	AtoNs, Military exercises, COVID restrictions	2010, 2014, 2016, 2018
Tuvalu	0		2016, 2018
Wallis & Futuna	Covered by New Caledonia	COVID restrictions	Covered by New Caledonia

c) New infrastructure in accordance with GMDSS Master Plan
Refer Operational Issues section in NAVAREA XIV report to WWNWS12.

d) Challenges and achievements
Refer Operational Issues section in NAVAREA XIV report to WWNWS12.

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
LINZ has challenges in recruiting experienced staff. With few qualified and/or experienced candidates available and only one IBSC recognised defence Category B Hydrographic Surveying course in the region, it is generally necessary to recruit from further afield. As such, New Zealand sees a real need for Hydrography and Cartography programmes to be developed and delivered in-region.

In November/December 2020 eight staff attended two weeks of training on the CARIS HPD Version 4 application, delivered virtually by Teledyne CARIS.

c) Status of national, bilateral, multilateral or regional development projects with a hydrographic component. (In progress, planned, under evaluation or study).
In 2015 LINZ and MFAT commenced 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 IHO 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 IHO 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 and Niue;
- chart improvement programmes for the Cook Islands, Niue, Samoa, Tokelau and Tonga have been progressed. Updated ENCs and paper charts have been published incorporating recent hydrographic survey data including data held by SPC.

The focus for the past 12 months has been improving the charts for Tonga and Niue. However, as a result of COVID-19 MFAT have reprioritised focus and funding to respond to the pandemic. This has impacted the availability of additional funding required to complete the current PRNI work programme, in particular, chart improvements for Samoa.

d) Description of proposals and requests to the IHO/CBSC
Actions required for NZ and other SWPHC members to achieve the Goals, Targets and Strategic Performance Indicators of the IHO Strategic Plan 2021-2026 will form future proposals and requests to the IHO CBSC.

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://marinedata.niwa.co.nz/project-map-sam/

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/).

NIWAs vessel, RV *Tangaroa* is undertaking a 45-day voyage to the Southern Ocean and Ross Sea. The vessel departed 10 January, returning 16 February. Scientists will carry out nine separate objectives to better understand the processes governing this region and the role of the Marine Protected Area (established in December 2017) in protecting this environment. These include surveys of fish species and seabed habitats, ecosystem studies of plankton, oceanographic and atmospheric measurements to improve understanding of climate-related processes, and making observations of whales.

b) GEBCO & Seabed 2030
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 Assembly Center (SaWPac). The SaWPac is run jointly by NIWA/GNS/LINZ and is hosted by NIWA. The next data delivery from the SaWPac is planned for February 2021. This will contribute to the Seabed 2030 project release of a beta version of the GEBCO grid in 2021. This beta version will contain more information and metadata; and be available in more formats than previous versions.

Due to COVID-related travel restrictions the Second SaWPac Regional Mapping Workshop was held on-line 23-24 June 2020. Forty-two participants from 11 countries attended the workshop. The next SaWPac Regional Mapping Workshop is planned as a VTC for June 2021. 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 (CSB) activities

- Is CSB data used nationally? If yes, in what products and/or services?
- What type of vessels obtained this CSB data?
- Has the wider international use of this CSB data been considered?
- Could this CSB data be used by GEBCO to improve the GEBCO grid?
- Would it be acceptable to share the data where it can be accessed by any organization (scientific, academic, industry (research/planning), charting authorities)?
- Would it be acceptable for the CSB data to be stored in the IHO DCDB?

  NZ has responded positively to IHO CL21/2020 for the provision of CSB data collected in national waters to be made available and stored in the IHO DCDB.

d) Tide gauge network
LINZ publishes tide predictions for Standard and Secondary Ports on the web http://www.linz.govt.nz/sea/tides.

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

As part of the Mapping NZ 2025 programme, Joining Land & Sea (JLAS) Project, LINZ will collect sea level data and complete 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 being 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
NIWA continues to deploy an array of new DART buoys with two deployment voyages over the last year. The DART buoy network will provide tsunami monitoring and detection information for Pacific countries, including Tokelau, Niue, the Cook Islands, Samoa and Tonga as well as New Zealand (https://www.beehive.govt.nz/speech/dart-buoys-announcement and https://www.beehive.govt.nz/release/new-zealand-tsunami-monitoring-and-detection-system-be-established)

f) Challenges and achievements
Mapping NZ 2025 JLAS project. Since 2018, 33 coastal link sites have been installed and calibrated by two contractors, iXblue Pty Ltd and Southern Hydrographic Limited. As with many activities in 2020, fieldwork was impacted by travel restrictions due to COVID-19. The creation of a new tidal model has been delayed due to the complexity of the task and availability of modelling expertise.

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 is leading and coordinating the NZ marine geospatial community. The NZ Marine Geospatial Information Working Group (NZMGI-WG), established in February 2019, has over 60 public and private NZ organisations represented. The NZMGI-WG has developed a national work programme. It is working collaboratively on the following priorities:

i. MGI being findable. The NZMGI-WG supported the completion of six NZ organisations marine data stocktakes. The results are published on data.govt.nz catalogues and will help enable reuse of NZ marine geospatial data,
ii. MGI being accessible. The NZMGI-WG is studying data portals that host NZMGI, aiming to help data custodians and users understand what platforms provide access to NZ marine geospatial datasets. The results of this study are published on the LINZ website.
iii. MGI being interoperable and reusable. Work is currently underway to provide national guidelines on marine geospatial metadata, standards and vocabulary. This work will support other organisations to contribute to the NZMGI stocktakes and facilitate connectivity of NZMGI.
iv. NZMGI community engagements, via regular meetings and conferences, webinars, newsletters and other communication channels. A MGI webpage

has been created on the LINZ website to raise awareness of the value of MGI and encourage participation in the WG and national work programme.

b) Relationship with the NSDI
NTR

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

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

NZ contributes ocean observation data to the Global Ocean Observation System via the NZ Ocean Data Network and the Australian Ocean Data Network portals.

d) National implementation of the Shared Data Principles – including any national data policy and impact on marine data.
NZ has an operational Government Open Data Policy and the NZ Government has Data and Information Management Principles which state data should be: open, protected, readily available, trusted and authoritative, well-managed, reasonably priced (preferably free) and reusable.

Work is currently underway to engage Indigenous Data Governance and more particularly Māori Data Sovereignty, so that FAIR Data Principles is complemented by the CARE Principles (Collective benefit, Authority to control, Responsibility and Ethics).

e) MSDI national portal
New Zealand does not have a single MSDI portal. Our approach is aligned with the UNGGIM IGIF where systems and data are interoperable and integrated. There are several data portals within NZ which host and serve MGI including LINZ Data Service - LDS, The NZ Ocean Data Network – NZODN. Other Portals will be identified as part of the NZMG-WG projects.

f) Best practices and lessons learned
In response to Goal 2 of the IHO Strategic Plan 2021-2026, LINZ will review the UN guiding principles for geospatial information management and audit against ther UN-GGIM Integrated Geospatial Information Framework (IGIF).

g) Challenges and achievements
A key challenge for LINZ and NZ is resources, capability and capacity.

Key achievements include coordinating a diverse user community and developing a joined-up work programme towards FAIR MGI for NZ. There is a growing appreciation for the value of MGI. This translates in the commitment from 8 national agencies as part

of the NZMGI Steering Group to lead projects within the work programme.

Additionally, LINZ is improving its foundational capabilities in the management, storage, interoperability and sharing of geospatial data to better prepare for our digital future.

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.

    In June 2020 an investigation was carried out into the use of UAVs and Structure from Motion to map small inter-tidal areas to a depth of approximately 3m. Future investigations will include UAV fitted with a bathymetric LiDAR sensor.

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

    c) Policy matters
    The New Zealand Hydrographic Authority (NZHA) is engaged with NZ Ministry of Foreign Affairs and Trade (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 SHPHC17	**Date**
MSDIWG11	February 2020
IBSC43	March 2020
CBSC18 VTC	June 2020
ENCWG5 VTC	July 2020
IRCC12 VTC	October 2020
2nd IHO General Assembly VTC	November 2020
DQWG16 VTC	February 2021

Future activities include:	
IBSC44	TBA
ENCWG6	TBA
S-101WG6	TBA
MSDIWG12 VTC	March 2021
CBSC19	June 2021
IRCC13	June 2021

    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 30 volunteer observer ships and 20 drifting meteorological buoys 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/data/linz-data/resilience-and-climate-change.

In support of the NZ Government response to the COVID-19 pandemic, LINZ contributed resources to validate datasets for the Ministry of Health (MoH) (pharmacies) and Fire and Emergency New Zealand (FENZ) (petrol stations). The main tasks were to validate information concerning operating hours; correct business name and address; determine if a pharmacy is dispensing or non-dispensing; and ensuring appropriate pharmacies are in both MoH and FENZ lists.

e) Environmental protection
NTR

f) Engagement with the Maritime Administration
LINZ and Maritime NZ signed an MOU in July 2017 to work together on matters of mutual interest. Strategic and operational meetings are held every six months, as required.

In May 2020 LINZ, in collaboration with Maritime NZ, published the *Good Practice Guidelines for Hydrographic Surveys in New Zealand Ports and Harbours*. This guidance document supports the *New Zealand Port and Harbour Marine Safety Code*. The Code is intended to assist port operator, councils, and Maritime NZ to work together to manage the safety of marine activities in New Zealand's ports and harbours by providing a voluntary standard to support national and local legislation.

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

h) Geophysical / geological surveys
GNS Science participated in four data acquisition voyages this year (See Table). Multibeam bathymetry data was collected for two of the voyages using the EM 302 sounder on board the RV Tangaroa. Other data collected during the voyages included drill core rock samples, Seismic, CSEM and Topas (high-frequency, shallow-penetration seismic). In addition, DART (deep-ocean Assessment and Reporting of Tsunami) buoys were deployed north of New Zealand and for the first time linked directly into the National Geohazards monitoring Centre in Wellington.

SURVEY	PROGRAM	AREA	VESSEL	INSTITUTION	START	END	Notes

IODP378	Drilling 1 site with coring and logging	Campbell Plateau	JOIDES Resolution	IODP	3/01/2020	6/02/2020	Successful geological data collection from drillhole
TAN2006	Seismic, TOPAS, MBES	East Coast , Hikurangi Margin	R/V Tangaroa	UA/GNS	24/06/2020	17/07/2020	1100 line km of 2D seismic data, 558 km2 of multibeam bathymetry data (Cruise report published in March 2021)
TAN2008	DART buoy deployment	Pacfic Ocean, North of New Zealand	R/V Tangaroa	GNS/NIWA/NEMA	24/08/2020	21/09/2020	Deployment of 8 DART buoys. In operation and monitored by National Geohazards monitoring Centre.
TAN2012	CSEM, TOPAS	East Coast , Hikurangi Margin	R/V Tangaroa	GNS/SIO	1/11/2020	13/11/2020	700 line km of Controlled source electromagnetic (CSEM) and multibeanm bathymetry data collected

i) International engagements

Meetings & conferences since SWPHC17	
IHO/OGC/UN-GGIM Combined Marine Geospatial Information Working Week, Rostock	February 2020
Geoscience Australia Seabed Mapping and Marine Geospatial Information Technical Meeting VTC	March 2020
FOSS4G SotM Oceania 2020	November 2020
OGC Marine Domain WG, VTC	December 2020
1st SWPHC MSDIWG	February 2021
Satellite Derived Bathymetry Day 2021	February 2021

Future activities include:	
Seabed 2030 SaWPac Regional Mapping Community	TBC
IC-ENC Steering Committee VTC	

j) Others

Mapping NZ 2025 is LINZ's 10-year programme to deliver the mapping, data and expertise needed to address some of the most significant challenges facing NZ—such as climate change, urban growth and water. Our vision is seamless land and sea mapping, from Āoraki/Mount Cook to the edge of the continental shelf.

The programme includes initiatives, leadership and investment. It builds on core LINZ expertise in mapping and charting, and brings in new technologies and data partnerships with other organisations.

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

12. Conclusions

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

a) *Areas of significant achievement*
b) *Areas of particular concern*
c) *Any other matters of interest to the SWPHC*
]

Over the past 12 months, the NZHA has made significant steps towards a digital first, data centric environment. Project Janus represents an overarching, multi-year project which will encompass numerous initiatives to ensure the NZHA successfully embraces the future opportunities for itself and wide-ranging customers. The project will focus on the implementation of the new S-100 standard.

In July 2020 LINZ launched the NZ ENC Service which provides registered customers with authoritative ENCs for New Zealand waters, plus automated fortnightly update notifications, at no cost.

The NZ Marine Geospatial Information Working Group, established in February 2019, has developed a national work programme which includes the identification of data portals and stocktakes of national datasets.

In June 2020 a new version of HYSPEC was published. Based on IHO S-44, this version reflects the changes in technology and methodology for the collection, processing and delivery of digital marine geospatial data and information. The document makes provision for bathymetric LiDAR and Satellite Derived Bathymetry.

During 2019/20, LINZ collaborated with Maritime NZ to publish the *Good Practice Guidelines for Hydrographic Surveys in New Zealand Ports and Harbours*. The guidelines provide guidance to decision-makers and operators for planning, carrying out and managing hydrographic surveys that; support the safe navigation of vessels in New Zealand ports and harbours; and help to protect our marine environment.

The COVID-19 pandemic has impacted numerous projects. From a national lockdown to varying levels of travel restrictions, field activities have been delayed and capacity building components of PRNI postponed. In addition, MFAT funding to complete the PRNI programme of work has been focused on responding to the pandemic in the Pacific Islands.

The next 12 months will see further initiatives as NZ moves towards a digital first environment. Similar to other Hydrographic Offices, the NZHA will have a focus on actions to deliver to the Goals of the IHO Strategic Plan 2021-2026.

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

Country: New Zealand
Organization: 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	No change
Country information / Informations sur le pays/ Información sobre el país	
-Declared National Tonnage -Tonnage national déclaré -Tonelaje Nacional Declarado	Tonnage: Date:
-National day -Fête nationale -Fiesta nacional	No change
-Date of establishment and Relevant National Legislation -Date de mise en place et législation nationale pertinente -Fecha de constitución y	No change

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	No change
-Number of INT charts published -Nombres de cartes INT publiées -Número de cartas INT publicadas	30
-Total number of paper charts published-Nombre total de cartes papier	167

publiées-Número total de cartas de papel publicadas				
-Number of ENC cells published -Nombres de cellules ENC publiées -Número de células ENC publicadas	326			
-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 2019			
Provided by:	LINZ			
Chart coverage	**Passage (%)**	**Coastal (%)**	**Port (%)**	
INT	100	100	0	**Comments on Surveys:** Hydrographic surveys carried out in: Fiordland, Pelorus Sound, Taranaki and Coromandel
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

National MSI Self-Assessment

Country: New Zealand
Organization: Maritime New Zealand

(Please provide the information in English)

See report to SWPHC18 supplied by Maritime New Zealand, NAVAREA XIV Coordinator