The NZ Marine Geospatial Information Working Group

Annual Meeting 6

Nau mai haere mai

Welcome to you all

In person ONLY

Join at menti.com
Code 3525 5717

Online ONLY

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Opening Karakia

Whakataka te hau ki te uru	Cease the winds to the West
Whakataka te hau ki te tonga	Cease the winds to the South
Kia mākinakina ki uta	Let the breezes blow over the land,
Kia mātaratara ki tai	Let the red-tipped dawn come with a sharpened air,
E hī ake ana te atākura	A touch of frost,
He tio, he huka, he hauhunga	A promise of glorious day
Tīhei Mauri ora	

Housekeeping

- The plenary sessions (until 2pm) will be recorded
- The meeting notes and actions will be published on the website
- Questions can be emailed directly to speakers or mgi24@linz.govt.nz

In person attendees

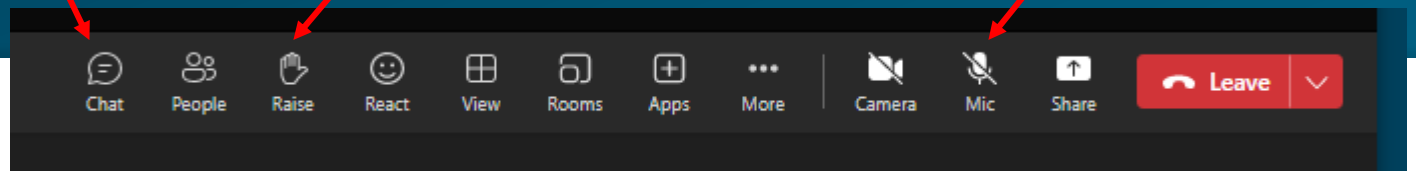
- Please wait for the microphone to ask questions
- Wi-Fi code - Network Name (SSID): GNS Science Guest, Password: Horouta2024

Virtual attendees

Post your questions in the meeting chat

To speak, please raise your hand and lower it afterwards

Please mute your microphones if you are not speaking



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Your priorities today

In person attendees

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Agenda

9.15 am	Geospatial alignment to policy drivers, New Zealand's case study (*Andy Coote, Consulting Where*)
9.35 am	IHO S-100, the new hydrographic geospatial standard for marine data (*Jonathan Pritchard, IIC Technologies*)
9.55 am	The NZ MGI work programme - Celebrating 5 years of achievements, road map updates and setting future priorities (*Anna Meissner, NZ MGI Working Group | Toitū Te Whenua LINZ*)
10.30 am	Morning tea and group photo
11.00 am	Enabling environmental data science and applications (*Peter McComb, Oceanum Science*)
11.25 am	Improvements in the mapping of commercial fishing effort (*Riki Mules, MPI*)
11.45 am	Electronic Navigational Charts and ArcGIS Maritime Server: Revealing the potential of the LINZ ENC Service beyond navigation (*Richard Wells, NZDF and John Plunkett, Eagle Technology*)
12.10 pm	Lunch
1.00 pm	Seabed 2030 and the challenge to map the World's Oceans (*Kevin MacKay, Seabed 2030*)
1.25 pm	Coordinated seafloor mapping - Opportunities for broader outcomes (*Stuart Caie and Brad Cooper, Toitū Te Whenua LINZ*)
1.45 pm	Interactive session and closing online meeting (*Anna Meissner, NZ MGI Working Group*)
2 pm	Workshop national coordinated seabed mapping programme and afternoon tea
4 pm	Refreshments and tour of the National Geohazards Monitoring Centre

Sponsors

GNS SCIENCE TE PŪ AO

OCEANUM OCEAN NUMERICAL

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IIC TECHNOLOGIES

EAGLE TECHNOLOGY

Session 1

Benefits & Opportunities for Marine Geospatial Information in New Zealand

Phaedra Upton (GNS Science)

MGI 24

Geospatial alignment to policy drivers: New Zealand case study

Andrew Coote

Chief Executive

ConsultingWhere

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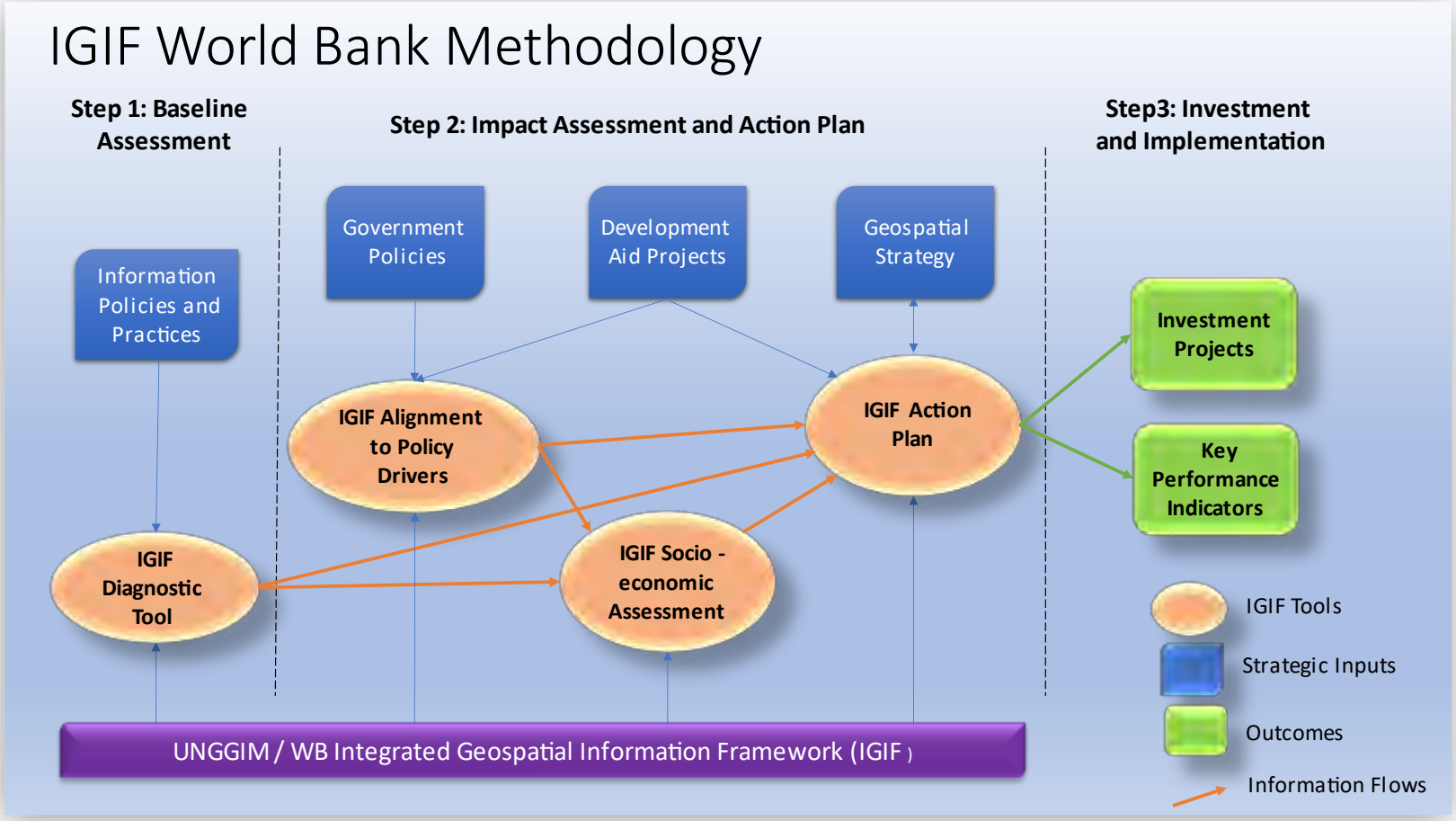
Context: Integrated Geospatial Information Framework(IGIF) Implementation Methodology

The World Bank Group has established an IGIF Implementation Methodology and corresponding analytical toolkit to support the use of the IGIF:

- **Incrementally strengthen geospatial information management -** customized to specific countries and priorities
- **Link to financing:** based on analytics, using standard WBG infrastructure model



The diagram shows the analytical tools (in orange), key inputs (in blue), the IGIF in purple, outcomes (in green). Arrows show the different types of information flows.

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World Bank IGIF Templates

•Diagnostic/Baseline Assessment

Business case
-Alignment to Policy/ Business Drivers
-Socio-Economic Impact Assessment

Action/Investment Plan

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The templates are available here

Workshop Objectives

- Overall aim of MGI WG - Focus on collaboratively delivering outcomes that optimally utilitise marine geospatial information to the cultural, social, environmental and economic benefit of New Zealand.
- In these sessions we wanted to:
  - To examine the problem(s) we are trying to solve by identifying the key policy drivers that MGI can help to deliver.
  - To document the use cases for MGI in a way that allows us to prioritise them.
  - From these inputs to define a vision of what success looks like.

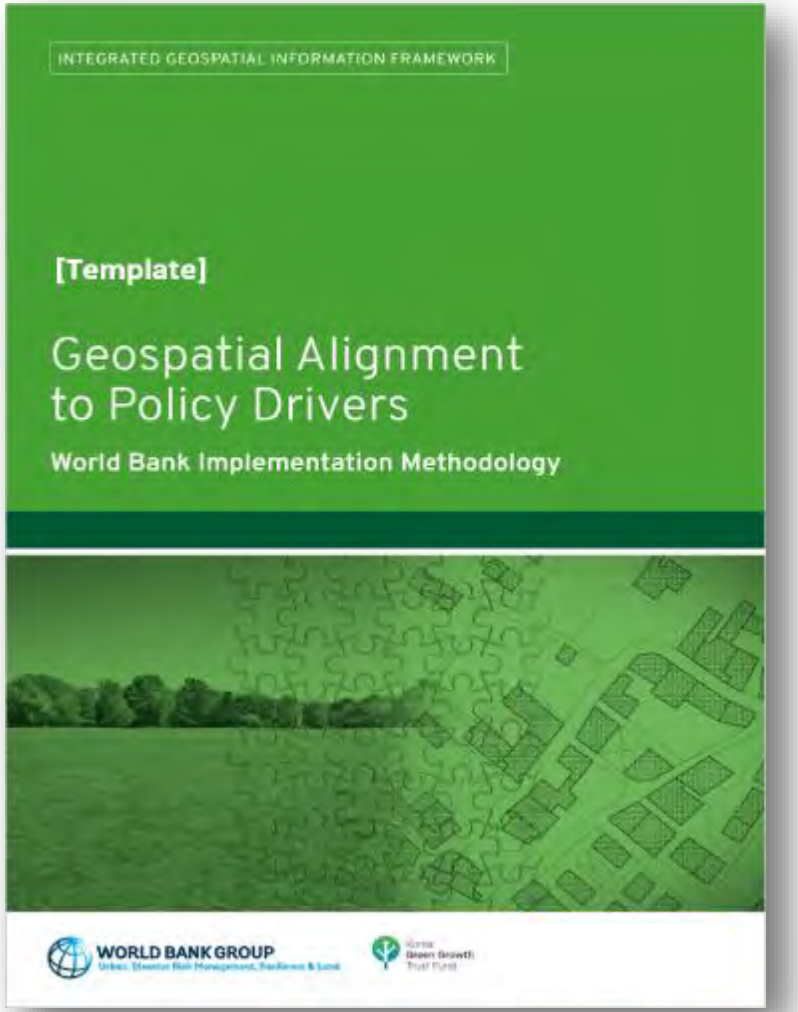
- We successfully used an online collaboration tool called Miro throughout the workshops.

Geospatial Alignment to Policy Drivers

Geospatial Alignment to Policy Drivers Template is used to align the Government's strategic objectives and international commitments to specific spatial use cases (applications) and then prioritizes them based on how well they support and accelerate achieving these strategic objectives.

This work is **key for communications and awareness raising with decision makers.**

The Geospatial Alignment to Policy Drivers Template is available for download here.



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Session 1 Outputs: Key Policy Clusters

Discussed how to analyse government policies and cluster them into high-level goals that MGI can help achieve. The results of this work was the following:

1 **Food security -** relates to primary industries. Includes agriculture, forestry, fisheries

2 **National security and safety**, including disaster risk reduction/management/resilience

3 **Protecting Natural Capital**, relates to all natural assets including environment, biodiversity

4 **Climate Change –**adaptation and mitigation

5 **Digital Transformation**, includes Data quality improvement, Data collection, Analytics (including AI), Ocean twin, Data management

6 **Economic Growth,** including blue economy and tourism

7 **Energy security**, includes renewable energy

8 **Culture and Heritage**, includes Matauranga Māori

9 **Social welfare and health.**

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Session 2 Outputs: Document Key Use Cases

1. Prioritise one or more use cases each, covering all relevant sectors
2. Explore how MGI can contribute to their delivery
3. Identify gaps, challenges /blockages, focus area for the WG to better deliver use case /meet policy drivers.
4. Link to IGIF Strategic Pathways
5. Develop vision / mission based on where MGI can deliver on highest priority drivers

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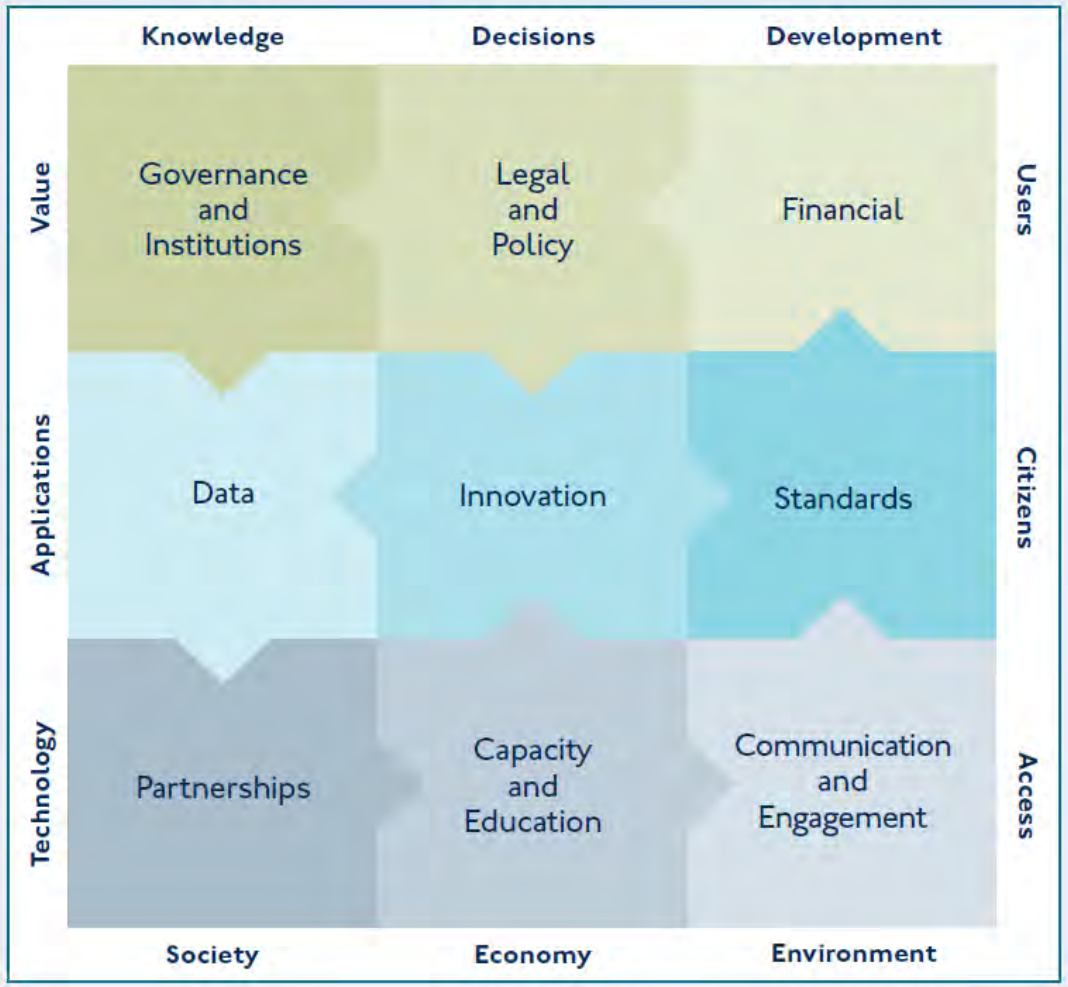
The UN-GGIM IGIF Nine Pathways model

Governance

Technology

People



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UN-GGIM
UNITED NATIONS INITIATIVE ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT

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Use Case Inventory

Use Case Summary	Priority	Detailed Description	Primary Outcomes Decription	Outcome Categories	Policy or Strategy Reference	Principal Data Types and Sources	Education and Capacity Building
Improved Decision Making in Marine Spatial Planning		MSP reflects the idea that oceans, seas and large internal bodies of water implement place-based management, where regulators delineate particular areas (Zoning) of the marine space. Create a Governance regime for those areas which address the needs and requirements of all users simultaneously.	Effective custodianship and stewardship of renewable and non-renewable resources(e.g. fish, (hydrocarbons, minerals). Single authoritative marine geospatial source for Marine Spatial Planning for public confidence and legal certainty.	2.1 2.2 2.3 4	Natural Capital Climate Change Energy Security	Diverse and potentially fragmented, from hard sources such as Bathymetry to dynamic data such as AIS and semi-subjective surveys of limited time-validity.	Hybrid technical skills across environmental science, geospatial and computer science.

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Outcome Categories

1	Revenue Generation	
	1.1	Increased taxation revenues
	1.2	Increased value from public assets
	1.3	New forms of revenue (e.g. congestion charging, parking fees)
2	Improved Efficiency - saving money	
	2.1	saving money / time for Public Sector
	2.2	saving money/time for Businesses
	2.3	saving money/time for citizens
3	Societal Benefits	
	3.1	Saving Lives
	3.2	Improving Quality of Life
	3.3	Transparency
	3.4	Other (please describe)
4	Decision Support - the outcomes of implementing the use case, improve information to support decision-making	
5	Public Investment and Asset Management	
6	Stimulate Innovation	

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Session 3 Output: Establishing Priorities

- Strategic Perspective:
  - Alignment to Government Agenda
- Economic Perspective:
  - Quantifiable Benefits
  - Timeframe for Realisation
- Qualitative Benefits:
  - Social Welfare Improvements
  - Environmental Protection

Exercise

- For this exercise imagine you are part of the most senior decision- making body in Government, the Cabinet of Ministers.
- The Cabinet receives many proposals from Government department for investment and must prioritise them and decide which to fund and when.
- You as a team have prepared use cases for improvement in Government services, mostly within you Ministry.
- Now it the time to “cast your votes” for what you think, as a Cabinet Member, should be supported with investment.
- There are two key criteria to base your assessment upon:
  - Strategic perspective
  - Economic perspective

- In addition, you can add social and environmental justifications in narrative form.

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Next Steps

- Complete prioritisation work
  - Select achievable goals for MGI
    - Short-term (within 1 year)
    - Medium-term (2-3 years)
    - Long-term (5 years)
- Prepare presentation for senior management
  - Vision
  - Overall goals – expressed in terms of supporting Government objectives
  - Outline Programme Plan with resources / deliverables / business case
- Secure buy-in to Strategy

- Anna will pick up on progress with this work in her presentation

Thank You!

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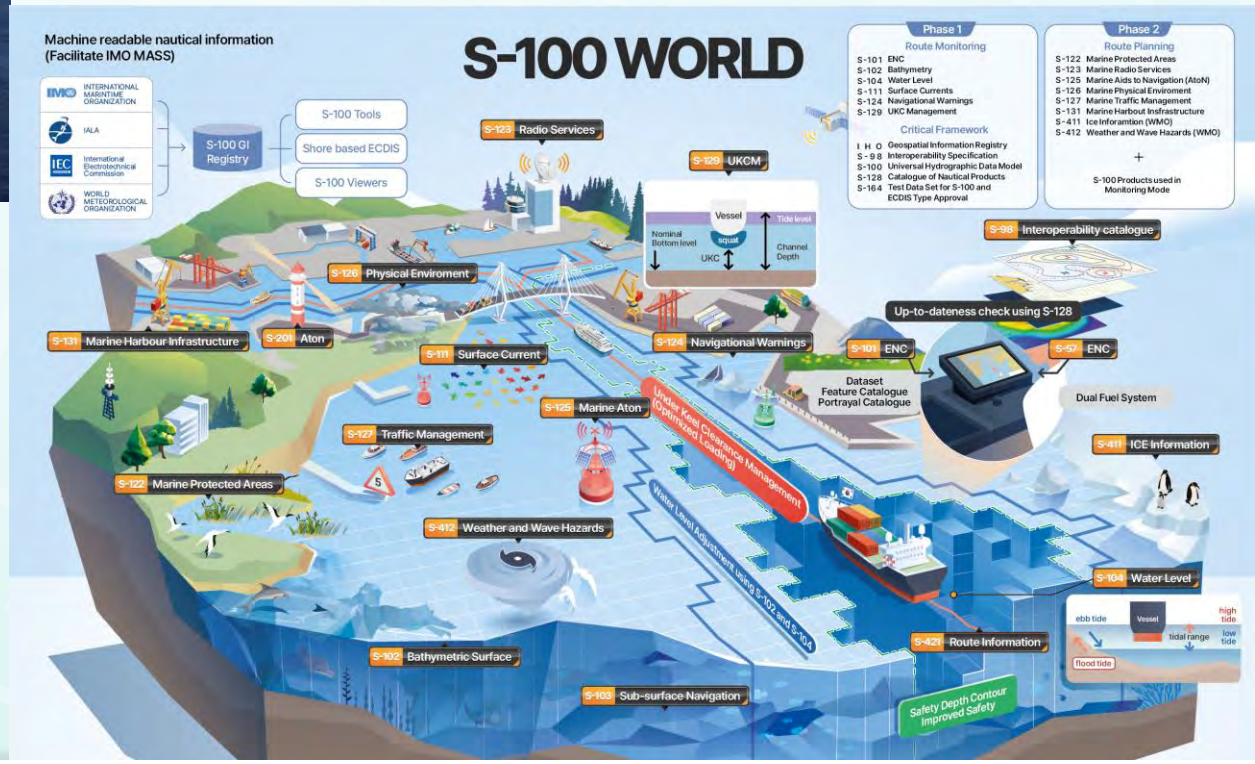
S-100

E-Navigation



What is it?

Supports:

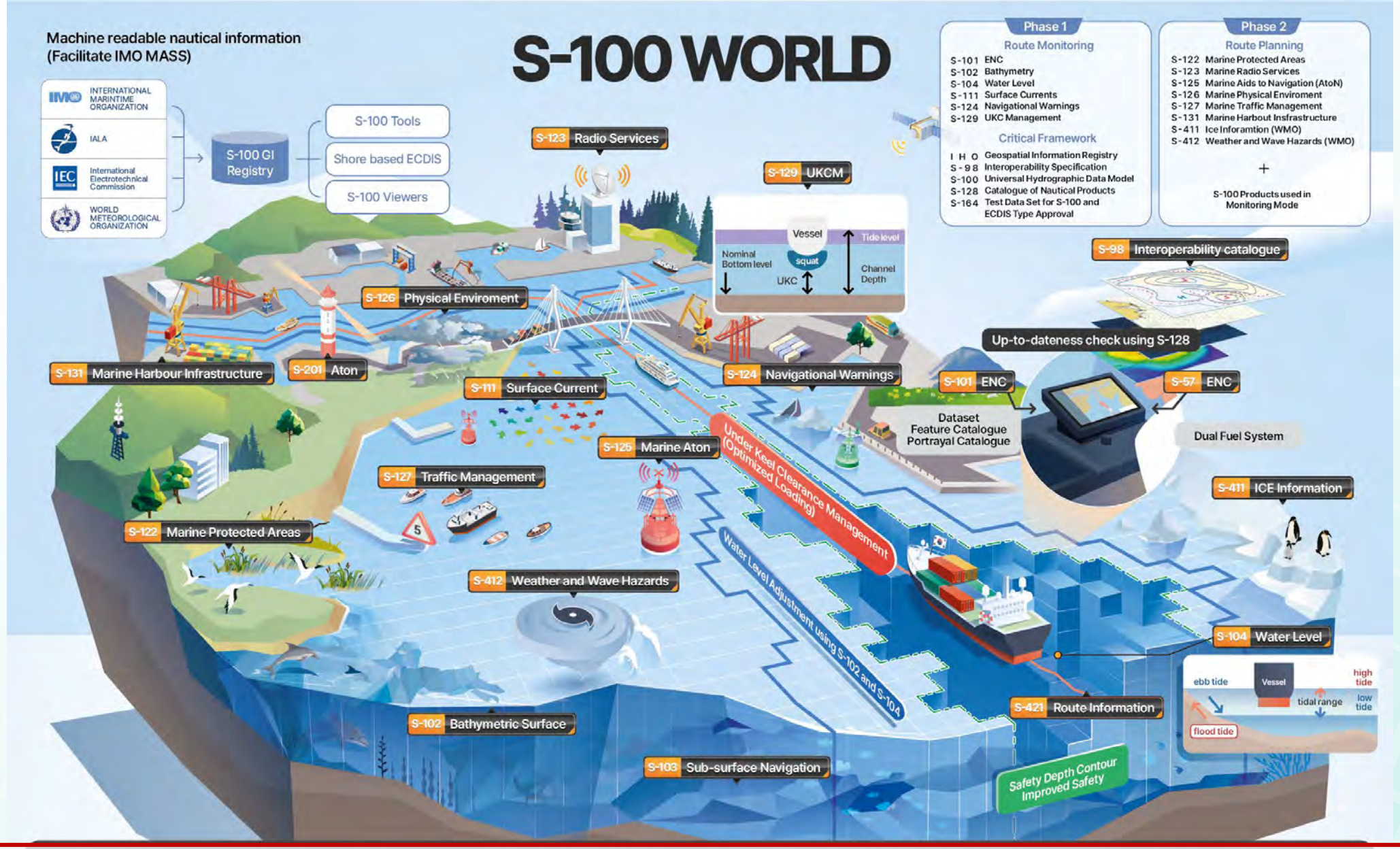
- Greater variety of marine-related digital data sources, products and customers

Enables:

- New applications that go beyond the scope of traditional hydrography

Incorporates:

- 3D, time-varying data (x, y, z and time) and web-based services for acquiring, processing, analyzing, accessing and presenting marine data



IHO S-100

S-100 is the IHO's flagship framework standard. It defines a methodology for the representation of many categories of marine phenomena, across multiple domains, as "product specifications".

ShoreECDIS 1.2.0.0 (November 01, 2022)
45° 24' 34.47" N
061° 04' 55.66" W
1: 22,000
Mercator
Sunday, 18 December 2022
RDOCAL
WP343
WP342
WP340
WP339
WP348
Pick Report
Radio Calling-In Point
Recommended Track
Information Area
Navigation Line
Navigational System of Marks
Depth Area
Attributes
Orientation Value 320 °
Traffic Flow Inbound
Display Name False
Language eng
Name 5A
Symbols
radio calling-in point for traffic in one direction only
Geometries
Curve
Spatial
Lower Low Water Large Tide
Higher High Water Large Tide
WGS84
Alert Message
Feature
Feature Geometry
Dataset
Latitude
Longitude
4,580 m RL 134 °T

Other Chart Features

Depth

S-101

"Geo-Regulation"

Marine Protected Areas

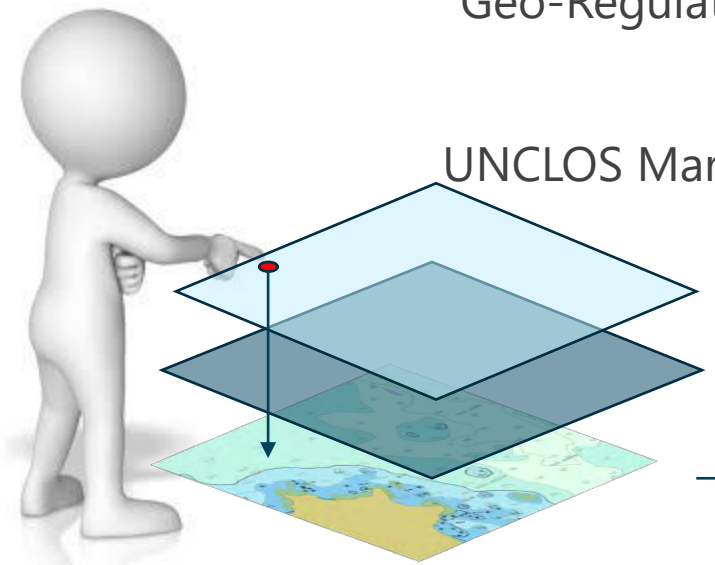
S-122

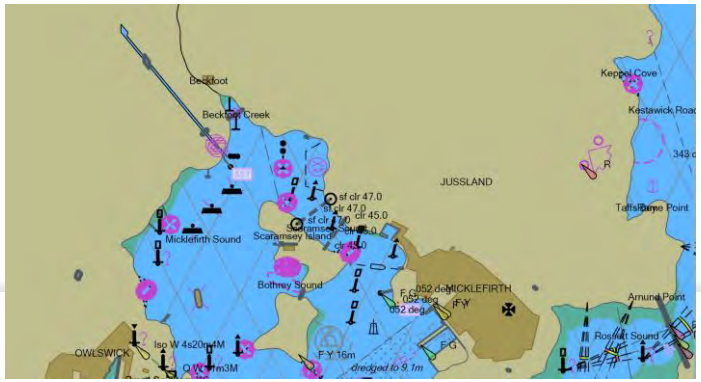
UNCLOS Maritime Zones

EEZ, Territorial Sea, Baseline, Boundary

"dry stuff"

S-121





Chart

Offshore wind farms are an important green investment to produce renewable energy. However, it must also co-exist and respect existing industries and investments such as tourism, fisheries, and marine transportation.
In this example, known **sea lanes** were considered in order to avoid these areas.

The NZ Marine Geospatial Information Working Group

Celebrating 5 years of achievements

Road map updates & future priorities

Anna Meissner
Toitū Te Whenua Land Information NZ
NZ MGI Work Programme Lead

MGI 24, 3 May 2024

Actions Meeting 5 – Feb 2023

	What	Who	When	Status
5.1	Review feedback from the meeting and identify next steps/ refine work programme, priorities and how to resource activities.	SG	End April 23	CLOSED
5.2	Resulting SG output (work programme / priorities) to be shared with the wider WG.	LINZ	End April 23	CLOSED
5.3	Share marine mapping economic reports	LINZ	Early March 23	CLOSED
5.4	Raise awareness of the WG with Iwi/ Māori and encourage participation	All	On-going	
5.5	Identify contestable funding opportunities	All	On-going	
5.6	Share outcome of Marine innovation Kaupapa 2 – Te Ao Māori worldview on MGI	LINZ	Dec 23	

TOR NZ MGI Working Group

Challenges

The NZMGI-WG identified a number of challenges that could prevent the success of the group and achievement of objectives:

	Challenge	Mitigation
1	Resourcing in terms of funding, capacity and capability.	The NZMGI-WG will establish a national common strategy, prioritise work and explore funding options. A Steering Group has been established to provide directions and approve the NZMGI-WG work and strategy.
2	Agreement on common goals, notably because of different business models and agendas.	The Steering Group will provide leadership, set directions for the work plan and facilitate the decision-making process.
3	Fair and meaningful representation.	The NZMGI-WG is open to representatives from the wider marine sector or with marine geospatial interests. Members are encouraged to engage within and outside their organisation, and at a higher level, to actively grow awareness of the NZMGI-WG work.
4	Ensuring the interests of Māori/ Iwi are well represented	All working group members will reach out to their relevant Māori/ Iwi contacts to make them aware of the NZMGI-WG and invite and encourage participation.
5	Getting buy-in at the senior/ executive level.	The NZMGI-WG will develop case studies showing the benefits of the work undertaken and communicate them to senior/executive champions from other organisations to influence up and across agencies.
6	Data storage and maintenance in perpetuity.	The NZMGI-WG will stay connected and aware of international best practise.
7	Industry/private sector see value in opening access to their data.	Case studies will describe the benefits and value of open data.

Working Group Membership

To ensure broad expertise, fair representation and effectiveness, the NZMGI-WG is open to representatives with interest in marine geospatial information from Central and Local Government agencies, Māori / Iwi groups, Crown Research Institutes, academia and the private sector.

TOR NZ MGI Steering Group

3. Roles and responsibilities

3.1 Steering Group Members

- Participate in the development, review, and management of the MGI work programme,
- Provide strategic direction and leadership to ensure that the MGI work program aligns with national interests to deliver lasting benefits,
- Determine work programme priorities with input from the working group,
- Work to achieve the MGI programme vision,
- Identify opportunities to advance the goals and objectives of the NZMGI-WG (see Terms of Reference for the NZMGI-WG),
- Connect experts from own organisations to the SG to advance work supporting Iwi/Māori accessing and using marine geospatial data
- Ensure that the correct organisations are represented in the Steering Group, by reviewing membership once a year,
- Share knowledge and technical expertise,
- Bring the interests, perspectives and priorities of their organisations and sector they represent and communicate current issues, risks, opportunities with relevant entities /groups/ initiatives (e.g. Ocean Secretariat, Marine Managers Hub, etc) for collaboration and future needs in the MGI space,
- Actively contribute (including resourcing) to work programme deliverables (incl. webinars, use case library),
- Attend and prepare for Steering Group and Working Group meetings, including propose agenda items, and complete assigned action items within agreed timeframes,
- Support the coordination and facilitation of the NZMGI-WG,
- Promote and communicate the value of the MGI programme to the marine community, government, and public,
- Elect a Chair and Vice-Chair when needed.

Actions Meeting 5 – Feb 2023

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5.6	Share outcome of Marine innovation Kaupapa 2 – Te Ao Māori worldview on MGI	LINZ	Dec 23	CLOSED

Previous Actions Remaining Open

	What	Who	When	Status
4.5	Communicate with NZMGI-WG framework and toolkit for Data Standards and Quality Assessment.	Liz Kolster (NZTA)	NZMGI-WG Meeting 5	OPEN
4.6	Organisations collecting MGI, email hydro@linz.govt.nz to contribute to the National MGI Stocktake & Inventory	All NZMGI-WG members	ON-GOING	CLOSED
4.7	Organisations interested in contributing to case study library email hydro@linz.govt.nz	All NZMGI-WG members	By 10 Dec 2023	CLOSED

The NZ Marine Geospatial Information Working Group

Celebrating 5 years of achievements

Road map updates & future priorities

Anna Meissner
Toitū Te Whenua Land Information NZ
NZ MGI Work Programme Lead

MGI 24, 3 May 2024

Key marine geospatial datasets are crucial for New Zealand. They support many aspects of our economy and contribute to better decision-making. Three percent of New Zealand's GDP is related to the blue economy, with a total of $7.4 billion directly related to sectors that rely on the maritime area.

Infrastructure

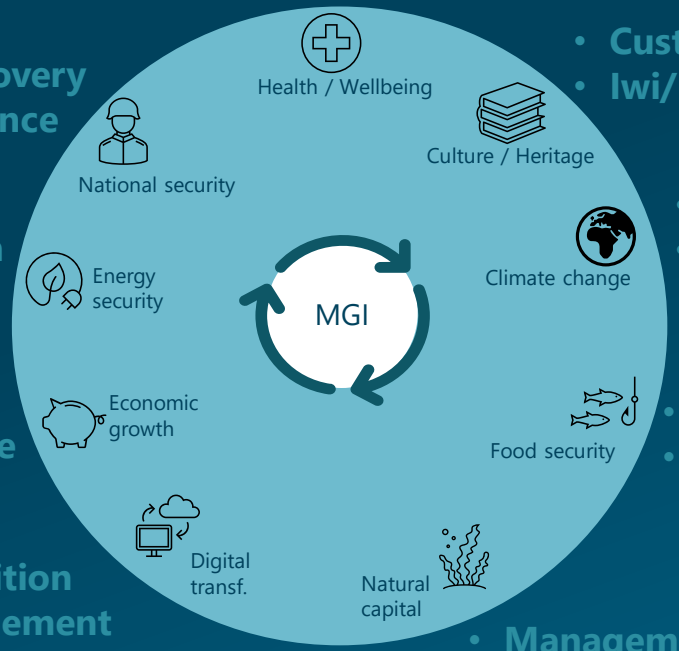
- Safety of navigation
- Improved social welfare

Admin areas and boundaries

- Emergency management and recovery
- Maritime awareness and surveillance

Biology

- Customary rights applications
- Iwi/hapu participation in fisheries management



Geoscience

- Resource and energy exploration
- Renewable energy

- Adaptation and mitigation
- Blue carbon sequestration

Matauranga Māori

- Aquaculture spatial planning
- Fisheries management

- Coastal and offshore infrastructure
- Blue economy
- Shipping

- Data acquisition
- Data management
- Data process and analytics

- Management and protection of natural assets
- Sustainable marine tourism

Hydrography

Ocean biochemistry

Ocean physics

NZ MGI Working Group

- **Est. February 2019**
- **2024: 200+ members from 70+ organisations across the public and private sector, CRIs, research institutes, Iwi/hapu.**

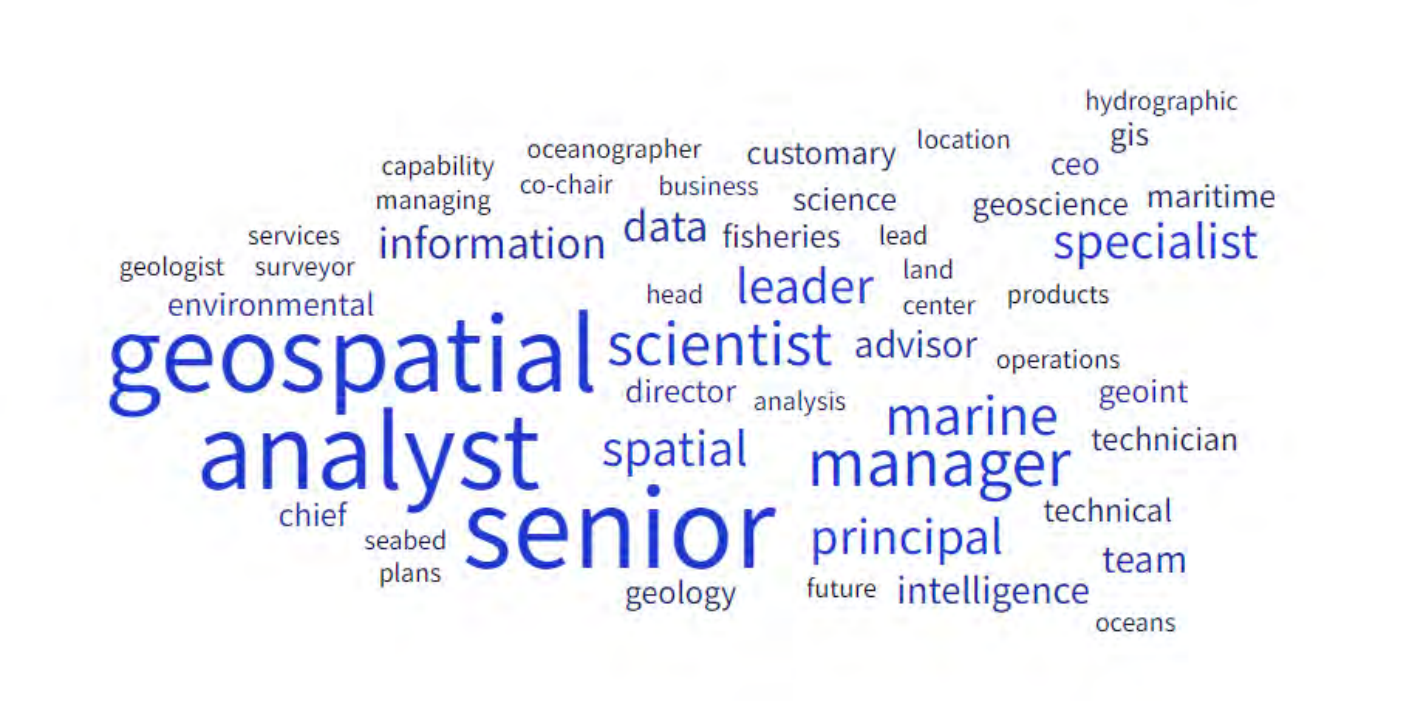
Working together to:

- Collaborate on data collection and focus on data reuse
- Increase transparency of data collections and surveys
- Simplify data discovery
- Facilitate data interoperability through standards
- Provide national leadership and coordination across agencies

The NZ MGI Steering Group

- Department of Conservation | Te Papa Atawhai
- Land Information New Zealand | Toitū Te Whenua
- Maritime New Zealand | Nō Te Rere Moana Aotearoa
- Ministry of Business, Innovation & Employment | Hīkina Whakatutuki
- Ministry for the Environment | Manatū Mō Te Taiao
- Ministry for Primary Industries | Manatū Ahu Matua
- New Zealand Defence Force | Te Ope Kātua o Aotearoa
- Office for Māori Crown Relations | Te Arawhiti
- National Institute of Water and Atmospheric Research | Taihoro Nukurangi
- GNS Science | Te Pū Ao
- Regional councils / Coastal Special Interest Group

Today: 80+ attendees, 25 organisations



Common interests

Achievements (2019 – 2024)

Inventories | Tools | Guidelines | Reports | Webinars | Use Cases | Infographics

Goals of the NZ MGI Working Group:

- MGI is Findable, Accessible, Interoperable and Reuseable (FAIR Data Principles)
- High-value marine geospatial data is collected and freely available
- Widespread knowledge of data applications and uses
- Visibility of future marine data capture to reduce duplication and leverage opportunities for partnerships
- Timely availability of datasets

✓ MGI web app (2024)

✓ MGI inventories data.govt.nz (2020)
✓ MGI stocktake guidance (2021)
✓ Visibility of surveys (2023)
✓ NZ National MGI inventory (2024)

✓ Data portal investigations (2019-2024)

✓ NZ MGI metadata guideline (2021)
✓ NZ MGI vocabulary guidelines (2021)
✓ Marine Data Innovation Project - technical POC (2022)

✓ Infographics (2018, 2019)
✓ Use case library (2021-2024)
✓ Webinars (2024)
✓ Marine Data Innovation Project - Te Ao Māori perspective (2024)

Fundings:

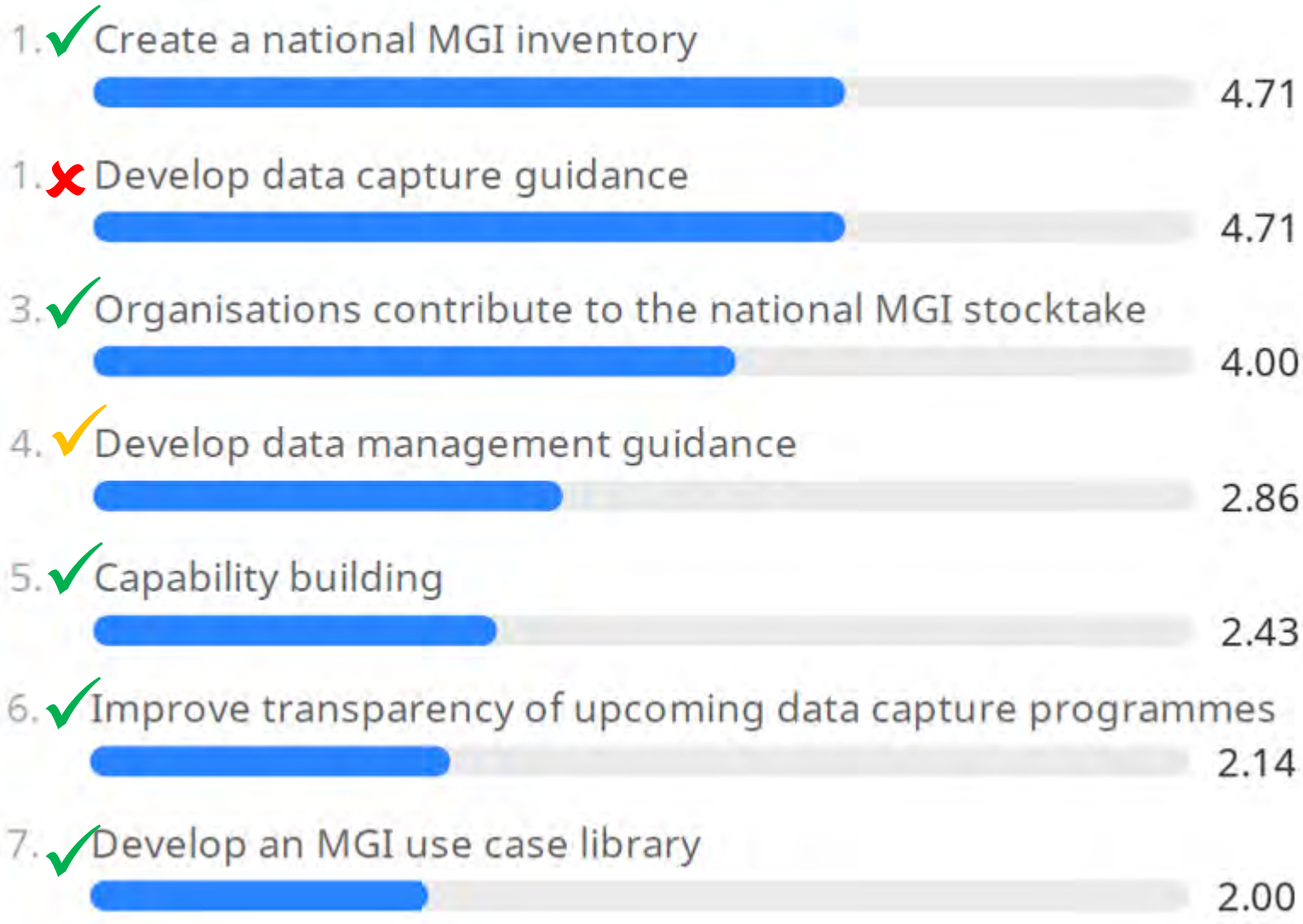
- **NZ Open Government Data Programme, StatsNZ (2019)**
- **Digital Public Service Innovation Fund, DIA (2021)**

NZ MGI Road Map 2023-2024

- Priorities (incl. Māori Kaupapa)
- Resourcing
- Achievable
- Quick wins

NZ MGI Road Map 2023-2024

Please rank the priority of the following work plan items



- **Vocabulary guidelines**
- **Metadata guidelines**
- **Stocktake guidelines**

Action 1: WG identify gaps for future data management guidelines

NZ MGI work programme Timeline as at May 2024

Priorities: **High** | **Medium** | **Low** | **Ongoing**

Status: On track | Needs support | At risk

Workstream	2023 Jan-Mar	2023 Apr-Jun	2023 Jul-Sep	2023 Oct-Dec	2024 Jan-Mar	2024 Apr-Jun	2024 Jul-Sep	2024 Oct-Dec
DATA & TECHNOLOGY								
Data collection	**NZ seabed mapping**	3DCM budget appropriation		Survey visibility	GNSS receivers	3DCM trial	Seabed mapping workshop	
Data discovery	**Marine Data Innovation Project Te Ao Māori perspective**	Wānanga	Huitopa	Report	Kahui Kaumatua	KK 1	KK 2	KK 3
Data discovery	**NZ National MGI Inventory**	LINZ, DOC, MPI, Reg Councils GW, ES, HB	MBIE, MNZ, GNS, NIWA Waikato RC	BOPRC, Auckland RC	MGI web app			
Data discovery	**International Marine Scientific Research**							
Data Access	**MGI Data Portals**							
Data Access	**Explore data sharing**							
PEOPLE								
Building capability / Education	**Webinars**		GIS Data for Māori & groups working in the marine environment			MGI web app		
Building capability / Education	**MGI Use Case library**		Supporting sustainable maritime activities		Assisting customary fishery management			
Collaboration & Comms	**Communication channels**	MGI 2023	Newsletter	Newsletter, Webpage updates	Newsletter, Webpage updates	MGI 2024, Newsletter	Newsletter	Newsletter
Project management	**Project management**			New Chair, SG strategic workshops, Vice-Chair, Editorial Team			Report	

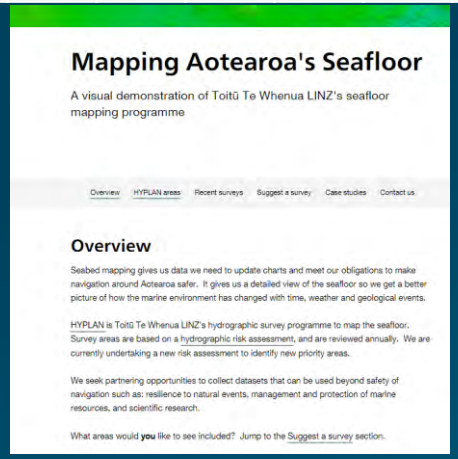
NZ MGI work programme Timeline as at May 2024

Priority **High**

Status On track

	2023				2024			
Workstream	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Data collection	**NZ seabed mapping**	3DCM budget appropriation		Survey visibility	GNSS receivers	3DCM trial	Seabed mapping workshop	

3D coastal mapping initiative to better prepare coastal communities for the impacts of climate change



Workshop 3 May 2024

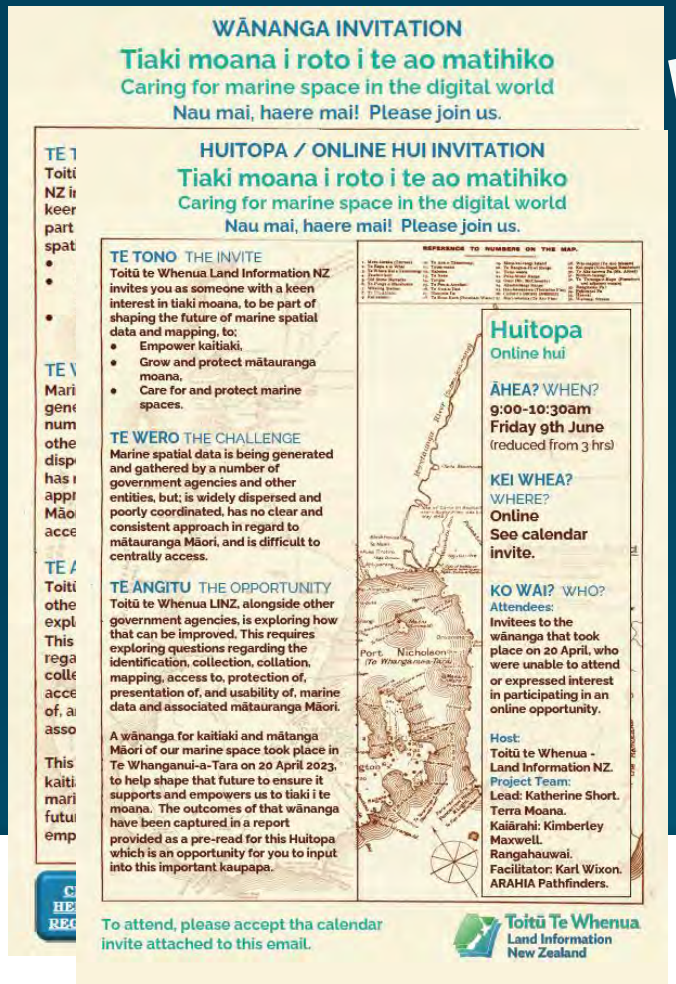
- What would a coordinated approach to seabed mapping look like for NZ?
- Develop data capture guidance?

NZ MGI work programme Timeline as at May 2024

Priority **Medium**

Status Completed

	2023				2024			
Workstream	**Jan-Mar**	**Apr-Jun**	**Jul-Sep**	**Oct-Dec**	**Jan-Mar**	**Apr-Jun**	**Jul-Sep**	**Oct-Dec**
Data discovery	**Marine Data Innovation Project Te Ao Māori perspective**	Wānanga	Huitopa	Report	Kahui Kaumatua	KK 1	KK 2	KK 3


WĀNANGA INVITATION

Tiaki moana i roto i te ao matihiko

Caring for marine space in the digital world

Nau mai, haere mai! Please join us.

HUITOPA / ONLINE HUI INVITATION

Tiaki moana i roto i te ao matihiko

Caring for marine space in the digital world

Nau mai, haere mai! Please join us.

TE TONO THE INVITE

Toitū te Whenua Land Information NZ invites you as someone with a keen interest in tiaki moana, to be part of shaping the future of marine spatial data and mapping, to;

- Empower kaitiaki,
- Grow and protect mātauranga moana,
- Care for and protect marine spaces.

TE WERO THE CHALLENGE

Marine spatial data is being generated and gathered by a number of government agencies and other entities, but; is widely dispersed and poorly coordinated, has no clear and consistent approach in regard to mātauranga Māori, and is difficult to centrally access.

TE ANGITU THE OPPORTUNITY

Toitū te Whenua LINZ, alongside other government agencies, is exploring how that can be improved. This requires exploring questions regarding the identification, collection, collation, mapping, access to, protection of, presentation of, and usability of, marine data and associated mātauranga Māori.

A wānanga for kaitiaki and mātanga Māori of our marine space took place in Te Whanganui-a-Tara on 20 April 2023, to help shape that future to ensure it supports and empowers us to tiaki i te moana. The outcomes of that wānanga have been captured in a report provided as a pre-read for this Huitopa which is an opportunity for you to input into this important kaupapa.

Huitopa

Online hui

ĀHEA? WHEN?

9:00-10:30am

Friday 9th June

(reduced from 3 hrs)

KEI WHEA? WHERE?

Online

See calendar invite.

KO WAI? WHO?

Attendees:

Invitees to the wānanga that took place on 20 April, who were unable to attend or expressed interest in participating in an online opportunity.

Host:

Toitū te Whenua - Land Information NZ.

Project Team:

Lead: Katherine Short. Terra Moana.

Kaiārahi: Kimberley Maxwell. Rangahauwai.

Facilitator: Karl Wixon. ARAHIA Pathfinders.

To attend, please accept tha calendar invite attached to this email.

Toitū Te Whenua Land Information New Zealand

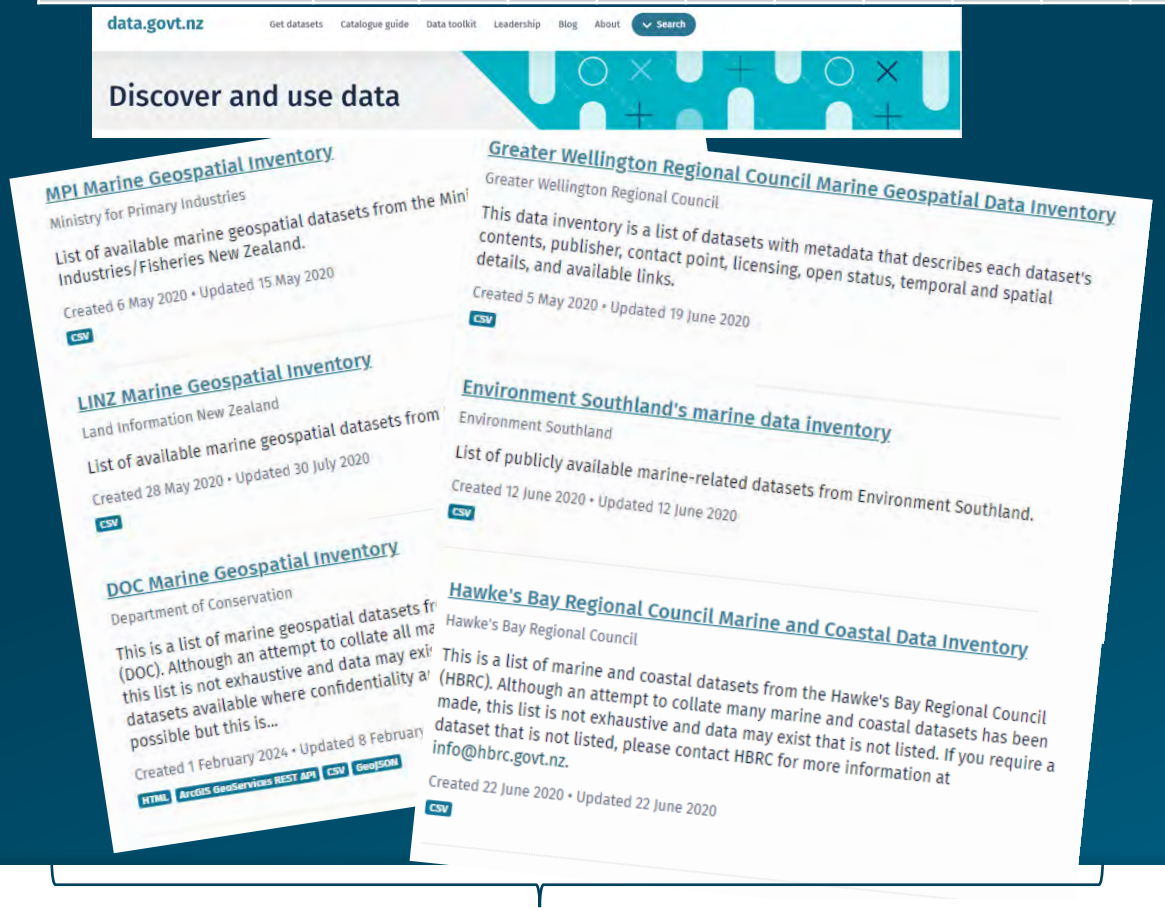
Available upon request at hydro@linz.govt.nz

NZ MGI work programme Timeline as at May 2024

Priority **High**

Status On track

Workstream	2023 Jan-Mar	2023 Apr-Jun	2023 Jul-Sep	2023 Oct-Dec	2024 Jan-Mar	2024 Apr-Jun	2024 Jul-Sep	2024 Oct-Dec
Data discovery	**NZ National MGI Inventory** LINZ, DOC, MPI GWRC, ESRC, Hawke's Bay RC		+ MBIE, MNZ, GNS, NIWA Waikato RC	+ BOPRC, Auckland RC				



High level inventory (data categories)

Contribution	2019-23	2023-24	2024-25
Central Gov organisations (SG)	3	2	1
Regional Councils	3	3	11
CRIs	-	2	-
Others	-	-	?

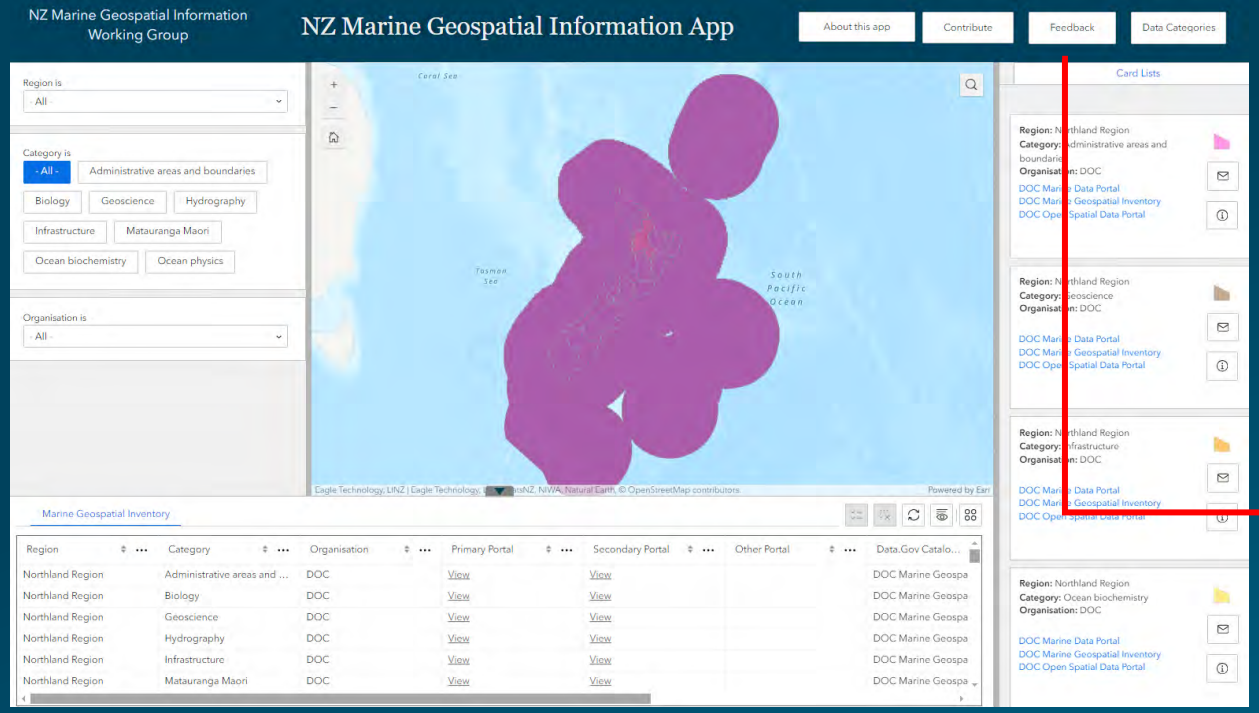
Action 2: Organisations (Regional Councils) contribute to National MGI Inventory

NZ MGI work programme Timeline as at May 2024

Priority **High**

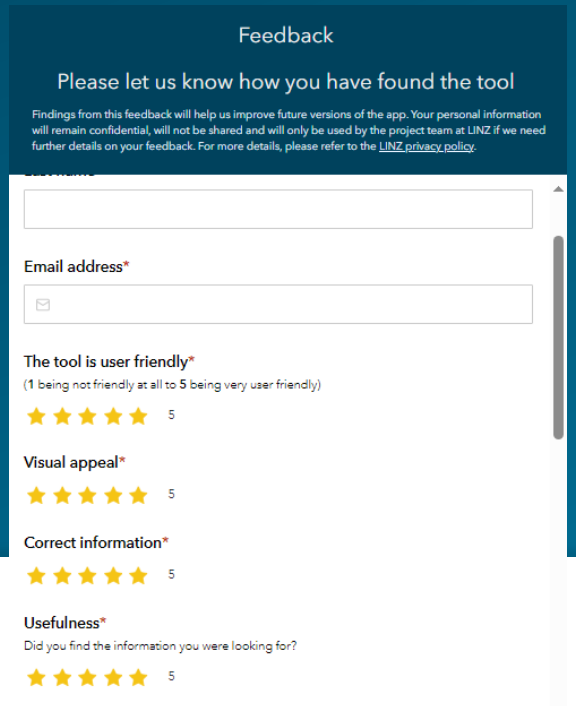
Status On track

Workstream	2023 Jan-Mar	2023 Apr-Jun	2023 Jul-Sep	2023 Oct-Dec	2024 Jan-Mar	2024 Apr-Jun	2024 Jul-Sep	2024 Oct-Dec
Data discovery	**NZ National MGI Inventory** LINZ, DOC, MPI GWRC, ESRC, Hawke's Bay RC		+ MBIE, MNZ, GNS, NIWA Waikato RC	+ BOPRC, Auckland RC		MGI web app		



Action 3: MGI Working Group provides feedback on MGI webapp + inventory

Action 4: Improve MGI webapp + inventory based on feedback (LINZ + MPI?)



NZ MGI work programme Timeline as at May 2024

Priority **Medium**

Status Resource constraints

Workstream	2023				2024			
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Data discovery			International Marine Scientific Research					

SSV Robert C. Seamans, USA

R/V Hakuho Maru, Japan

- International scientists apply to undertake Marine Scientific Research (MSR) in the NZ Territorial Sea, EEZ and Continental Shelf.
- MFAT manages MSR applications.
- Consents granted with conditions (i.e. provide NZ with data, samples and reports about research).
- Toitū Te Whenua = point of contact for MSR-related data and report enquiries, and ensures researchers comply with their obligations.
- Data received by LINZ (Bathymetry), GNS Science (Geology) and NIWA (Biology, Oceanography)

Action 5: Increase visibility of international research in NZ waters (LINZ+GNS+NIWA?)

NZ MGI work programme Timeline as at May 2024

Priority: Medium | Low

Status

Workstream	2023 Jan-Mar	2023 Apr-Jun	2023 Jul-Sep	2023 Oct-Dec	2024 Jan-Mar	2024 Apr-Jun	2024 Jul-Sep	2024 Oct-Dec
Data access	MGI Data Portals							
						Explore data sharing		

MGI Data Portals project aims to:

- support data users in finding, accessing and reusing NZ MGI
- encourage data custodians to share the MGI they hold

AUS SEABED

GEOME

NZODN

Toitū Te Whenua Land Information New Zealand

LAWA LAND AIR WATER AOTEAROA

Action 6: SG creates a survey to understand value of data portal investigation

Action 7: WG completes above survey

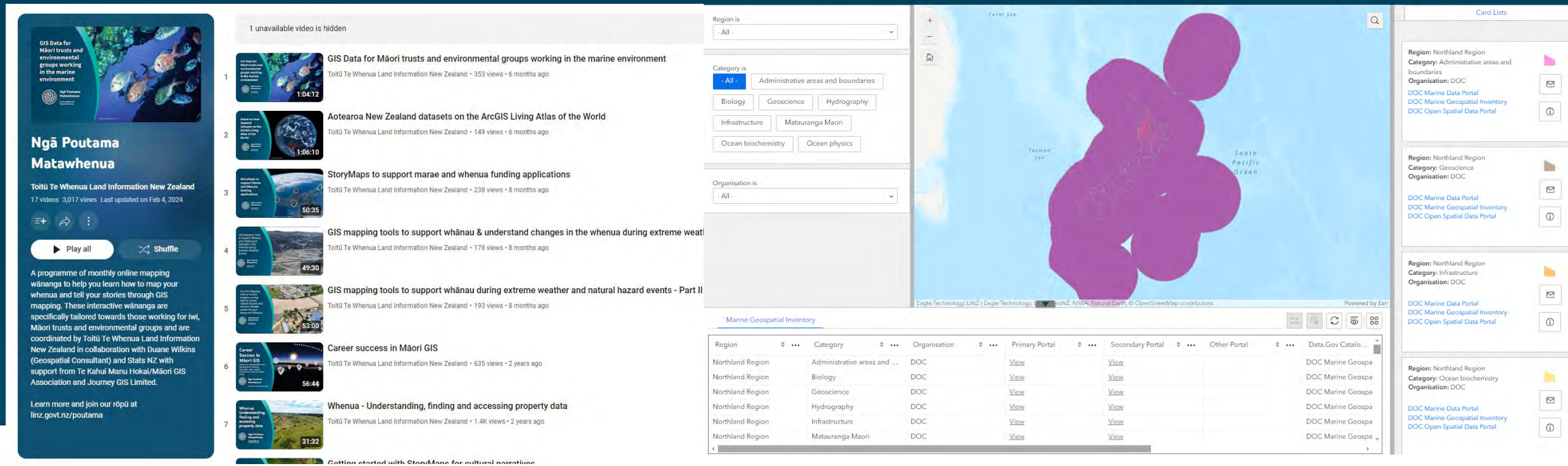
Purpose of the portal	Discoverability of data or metadata catalogue
	Visualisation of data and geospatial information
	Access to data
	Other
Types of marine geospatial data supported by the portal	Species data (e.g. seabirds, fish, algae, invertebrate, marine mammals, etc)
	Community data (e.g. species distribution, modelling datasets, species turnover, etc)
	Ecosystem data (e.g. marine habitat)
	Depth/bathymetry (e.g. grids, soundings, contours, surfaces, models, etc)
	Geophysical (e.g. seafloor characteristics, backscatter, sedimentology, slopes, curvature, rugosity, ground sampling, etc)
	Water observations (e.g. temperature, turbidity, water column backscatter, salinity, sound velocity profiles, etc)
	Sea level data (e.g. coastline, tidal data, etc)
	Meteorological data (e.g. air temperature, air pressure, wind, etc)
	Marine infrastructure (e.g. hazards, marine farms, coastal construction, aids to navigation, etc)
	Human activities (e.g. pollution, plastics, chemicals, oil, gas, vessel tracks, commercial catch effort, recreational fishing intensity, etc)
	Management areas (e.g. marine reserves, sanctuaries, fishing restrictions, Mataitai, Taiapure, fishing reporting grids, etc)
	Other
Data is supplied by	Own organisation
	Other organisations / Third party
External data is uploaded by	Portal owner / Own organisation
	Data supplier
External data is managed by	Portal owner / Own organisation
	Data supplier
Third party data supplier is responsible for	Costs of their data being uploaded on the portal
	Costs of their data being maintained on the portal
	Costs of their data being stored on the portal
	Costs of their data being accessed/downloaded on the portal
	Costs of the portal infrastructure being maintained and administered
	Other costs
Accessibility	Direct download
	API
	Webservices (wmts, wms, wfs, etc)
	Physical media (USB drive, disc, etc.)
	Other
Data exploration	Search
	Filter
	Subset
	Custom visualisation (e.g. turning layers on/off, zooming, changing basemap, etc)
Data reuse	Data released under open licence (e.g. Creative Commons, etc)
	Licensing restrictions exist
	Other licensing policy
	Free access/reuse the data
Standards	ISO 19115/19139
	OGC Web Services
	Predefined / standardised vocabularies
	Proprietary standard
	Custom standards
	other

NZ MGI work programme Timeline as at May 2024

Priority **Ongoing**

Status Would benefit from your contribution

Workstream	2023 Jan-Mar	2023 Apr-Jun	2023 Jul-Sep	2023 Oct-Dec	2024 Jan-Mar	2024 Apr-Jun	2024 Jul-Sep	2024 Oct-Dec
Building capability / Education	**Webinars**		GIS Data for Māori and groups working in the marine environment			MGI web app and MPI data		



Action 8: WG suggests topics for future webinars

NZ MGI work programme Timeline as at May 2024

Priority **Ongoing**

Status Would benefit from your contribution

Workstream	2023 Jan-Mar	2023 Apr-Jun	2023 Jul-Sep	2023 Oct-Dec	2024 Jan-Mar	2024 Apr-Jun	2024 Jul-Sep	2024 Oct-Dec
Building capability / Education	**Webinars**		GIS Data for Māori & groups working in the marine environment			MGI web app		
	MGI Use Case library		Supporting sustainable maritime activities		Assisting customary fishery management			

Action 9: WG provide topics and content for new use cases

NZ MGI work programme Timeline as at May 2024 Priority **Ongoing** Status On track

Workstream	2023 Jan-Mar	2023 Apr-Jun	2023 Jul-Sep	2023 Oct-Dec	2024 Jan-Mar	2024 Apr-Jun	2024 Jul-Sep	2024 Oct-Dec
Collaboration & Comms	**Communication channels** MGI 2023		Newsletter; Webpage updates	Newsletter	Newsletter; Webpage updates	Newsletter	Newsletter	Newsletter
Project management	**Project management** SG	SG	SG	SG Chair	SG VC	Editorial Team SG	SG	SG

Action 10: WG contributes to newsletters (topics and content)

Actions Meeting 6 – May 2024

Action	What	Who	When	Status
4.5	Understand how Data Standards and Quality Assessment framework and toolkit can apply to NZ MGI work programme	SG + NZTA	31 Aug 2024	OPEN
6.1	Identify gaps for future data management guidelines	All WG	30 Sep 2024	OPEN
6.2	Organisations contribute to National MGI Inventory - contribution button in the MGI webapp Experience (arcgis.com)	RC + others	30 Sep 2024	OPEN
6.3	Provide feedback on MGI webapp + inventory - feedback button Experience (arcgis.com)	All WG	31 Jul 2024	OPEN
6.4	Improve MGI webapp + national inventory based on WG feedback	LINZ + MPI	30 Sep 2024	OPEN
6.5	Increase visibility of international research in NZ waters	LINZ, GNS, NIWA	31 Aug 2024	OPEN
6.6	Create a survey to understand value of data portal investigation	SG	31 Jul 2024	OPEN
6.7	Provide feedback / complete survey on data portal investigation	All WG	30 Sep 2024	OPEN
6.8	Contribute topics for future webinars	All WG	31 Aug 2024	OPEN
6.9	Contribute topics and content for use cases (form linked on MGI website)	All WG	31 Aug 2024	OPEN
6.10	Contribute topics and content for newsletters - email editorsmgi@linz.govt.nz	All WG	31 Aug 2024	OPEN
6.11	Share topics for presentations and workshops for MGI 25	All WG	28 Feb 2025	OPEN

Thank you for being part of this work!

Any Questions?

The NZ MGI Steering Group

- Enrique Pardo and Jodie Robertson - DOC
- Anna Meissner (Chair) and Stuart Caie - LINZ
- Bonita Cooper - MNZ
- Miles Dunkin (Vice-Chair) and Heather Duarte - MBIE
- Aaron Napier and Rachel Corran - MfE
- Emma Burge and Rātā Chapman Olsen - MPI
- Tony Paku and Apanui Skipper - MPI (Customary Fisheries)
- Robin Kuhn - NZDF
- Richard Jennings and Karl Majorhazi - Office for Māori Crown Relations
- Jenny Black and Jess Hillman - GNS Science
- Jochen Schmidt and Mike Williams - NIWA
- Stacey Faire (Bay of Plenty), Becky Shanahan (Hawke's Bay) and Stephen Hunt (Waikato) – Regional Councils

The NZ Marine Geospatial Information Working Group

Annual Meeting 6

Karakia mō te Kai

Whakapaingia ēnei kai	Bless these foods
Hei oranga mō ō mātou tinana	For the goodness of our bodies
Mō ō mātou wairua hoki	And our spirits also
Hāumi e! Hui e! Tāiki e!	Draw together! Affirm!

Morning tea break

Session 2 will start at 11.00 am

Session 2

Data Reuse

Miles Dunkin (MBIE, Vice-Chair NZ MGI Steering Group)

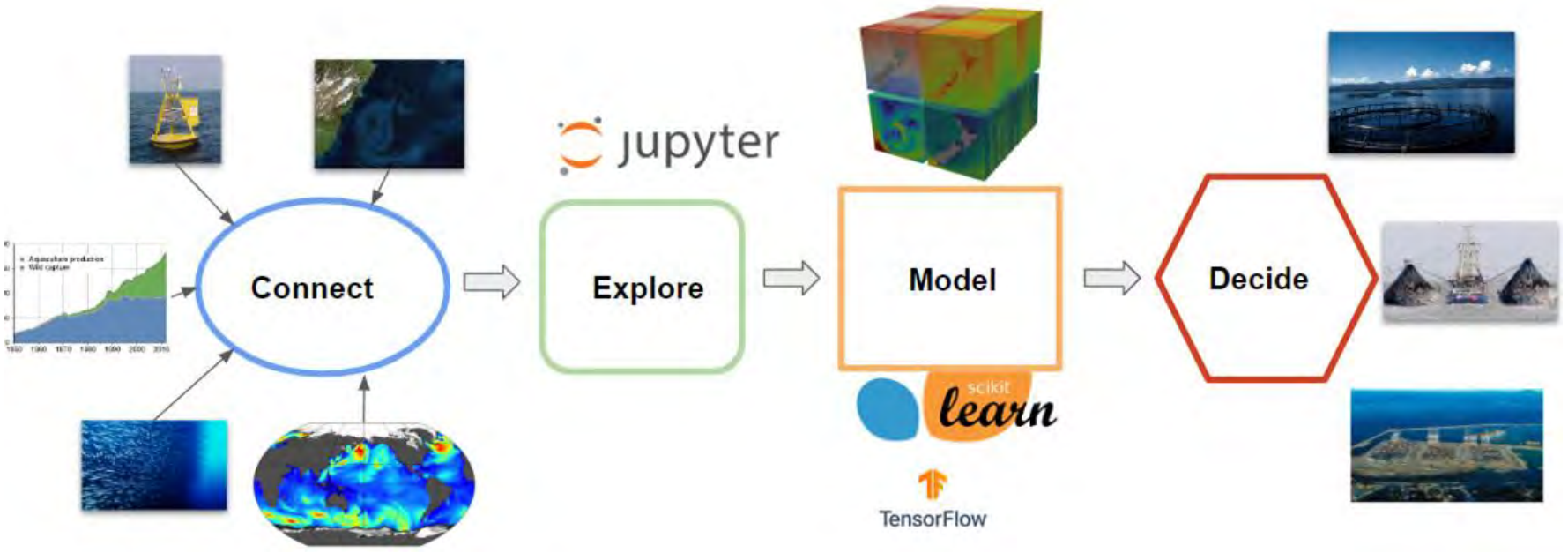
OCEANUM
OCEAN NUMERICAL

Enabling environmental data science and applications

An update on Datamesh and the ongoing developments in the OCEANUM.IO platform

NZ Marine Geospatial Information Working Group meeting - 3 May 2024

The mission is transforming data into decisions



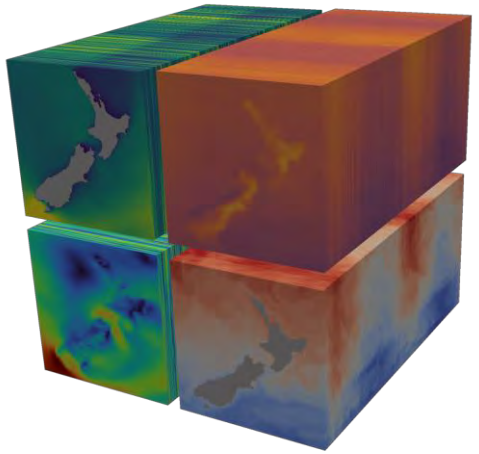
There is a need to transform data into decisions - faster

Oceans of data!

- But it's often hard to find and even more difficult to access.
- It might be poorly described or in a weird format, and it's not LLM-ready.
- You probably spend a lot of your time just getting it sorted.
- All this is even harder for people in the lesser developed economies.

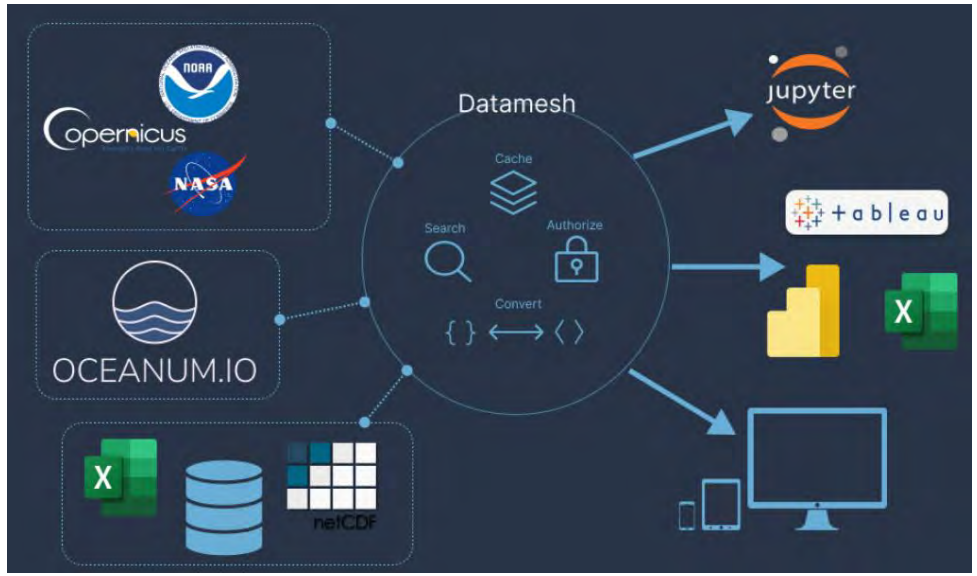
Imagine a world where the datasets of importance to you are searchable, and accessible - in a consistent format over the spatial and temporal extent you require, delivered to your preferred working environment within seconds.

Strategic purpose



- OCEANUM.IO seeks to abstract away the core data engineering problems for both expert and non-expert users in environmental science and adjacent disciplines.
- The science community benefits from well-architected national data infrastructures, but even these can create barriers and sources of friction for users.
- Success is making our client developers, engineers, planners, scientists and analysts reach their conclusions and deliver their solutions faster and more cost-effectively.
- Goal is to promote data democracy and lubricate the applied science economy, while trying to reduce knowledge asymmetry.

Our technical solution - Datamesh



- Full authorization layer
- Format conversion, interpolation and subsetting
- Data caching to optimise access performance
- Native support for Python and R data science libraries
- Massive scalability within the cloud to match user demand
- APIs conforming to Open Geospatial Consortium specifications
- Connection to internal data services and databases
- Connection to external 3rd party data sources
- Integration with analysis and display platforms such as Jupyter, ArcGIS, QGIS, Google Earth

The DIA proof of concept successfully deployed the Datamesh across four NZ govt agencies.

Te Arawhiti
THE OFFICE FOR MĀORI CROWN RELATIONS

Toitū Te Whenua
Land Information New Zealand

Ministry for Primary Industries
Manatū Ahu Matua

Department of Conservation
Te Papa Atawhai

The deployment landscape to date…

Creating effective pathways to impact

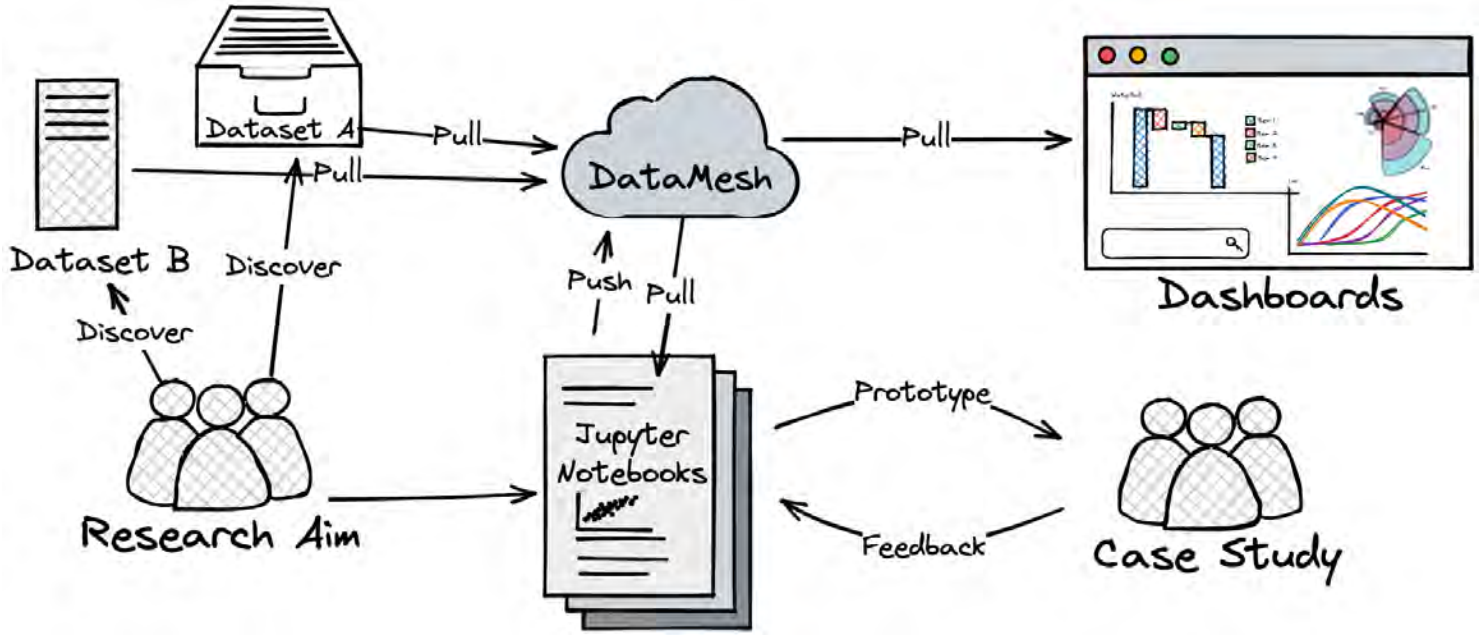


Image credit: Mario Krapp

Well organised multi-source data allows rapid development of innovative apps and dashboards.

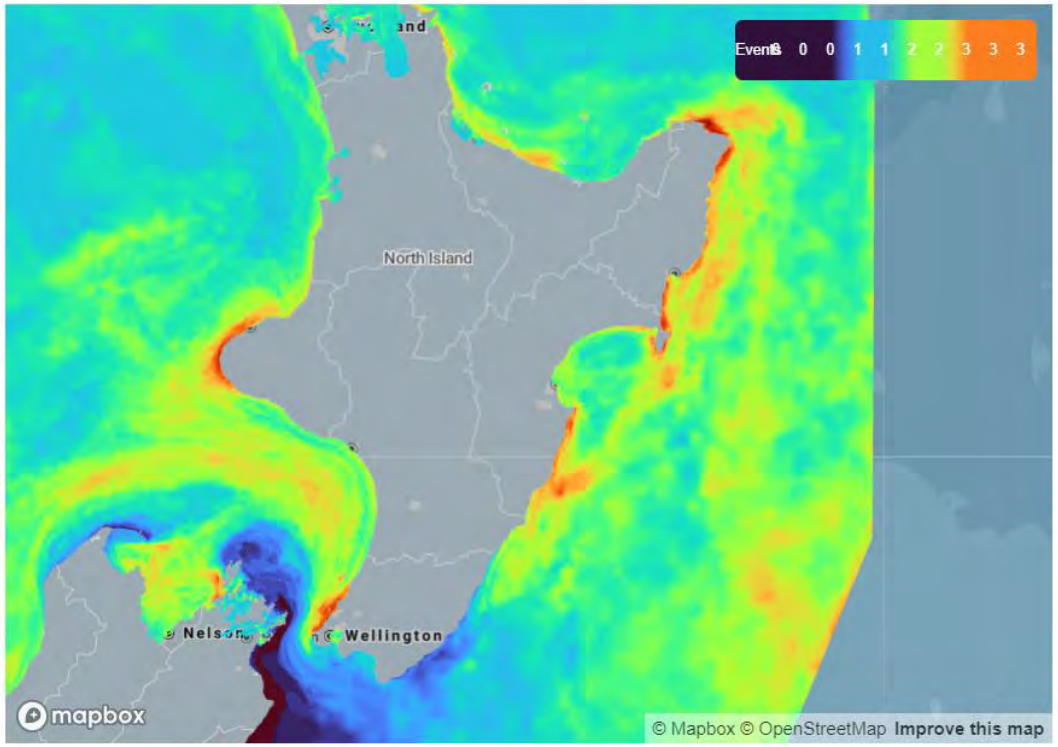
Operational pipelines are already in place, so moving from R&D to impact becomes a simple step.

Calculate new parameters on the fly and leverage emerging LLMs.

Create meaningful knowledge.

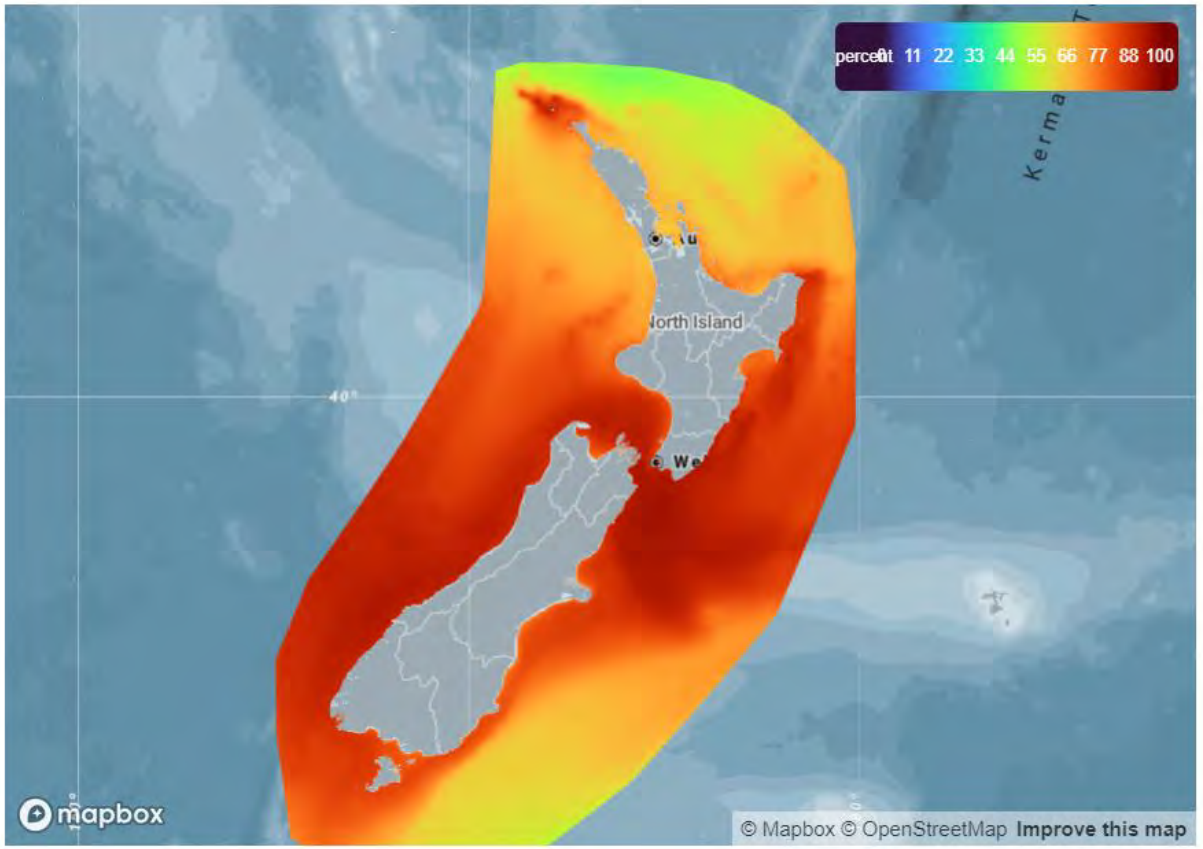
… asking specific questions of your data

Events longer than: 7 days | Values: above | Temperature: 18 deg. | Depth: 0 m



Number of events per year

all seasons

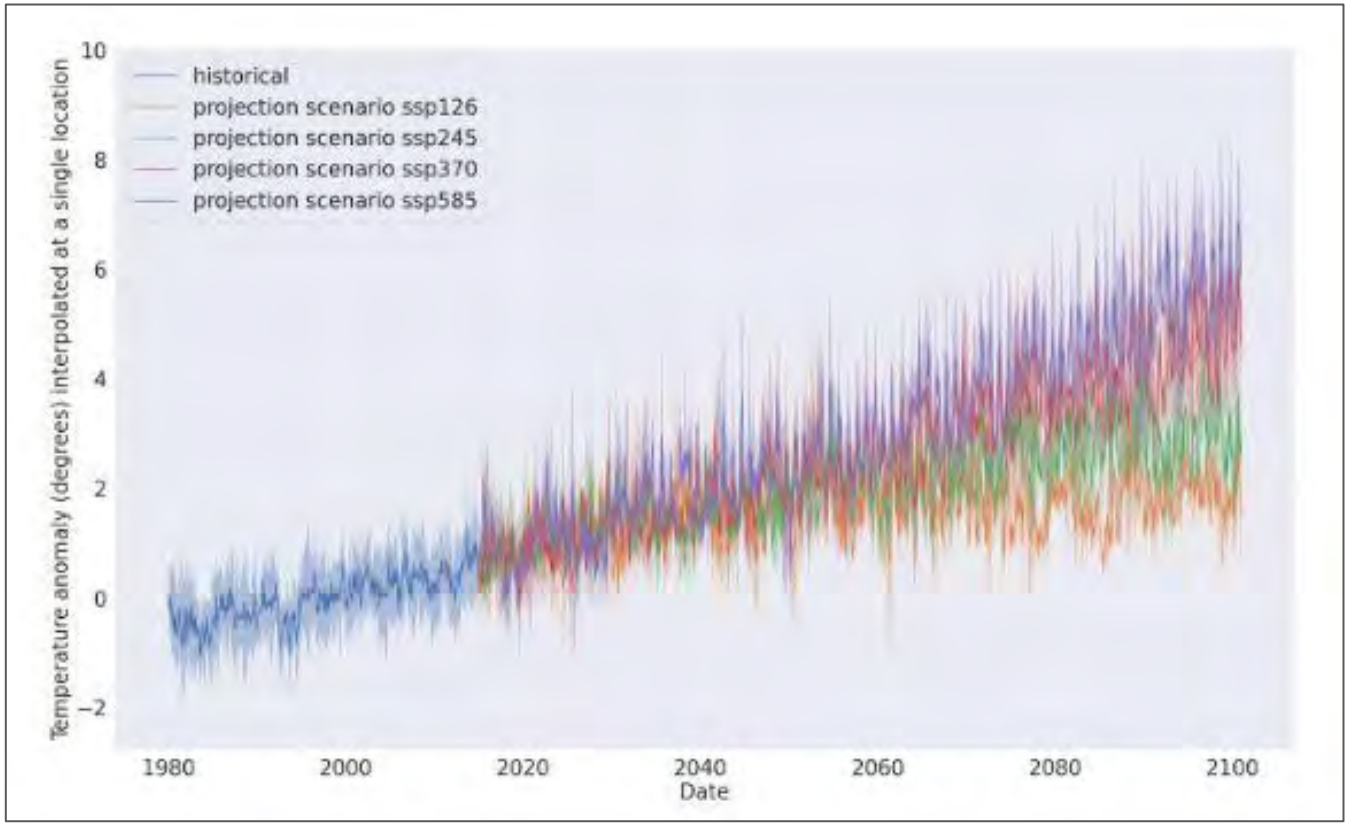


Salmon growth rate

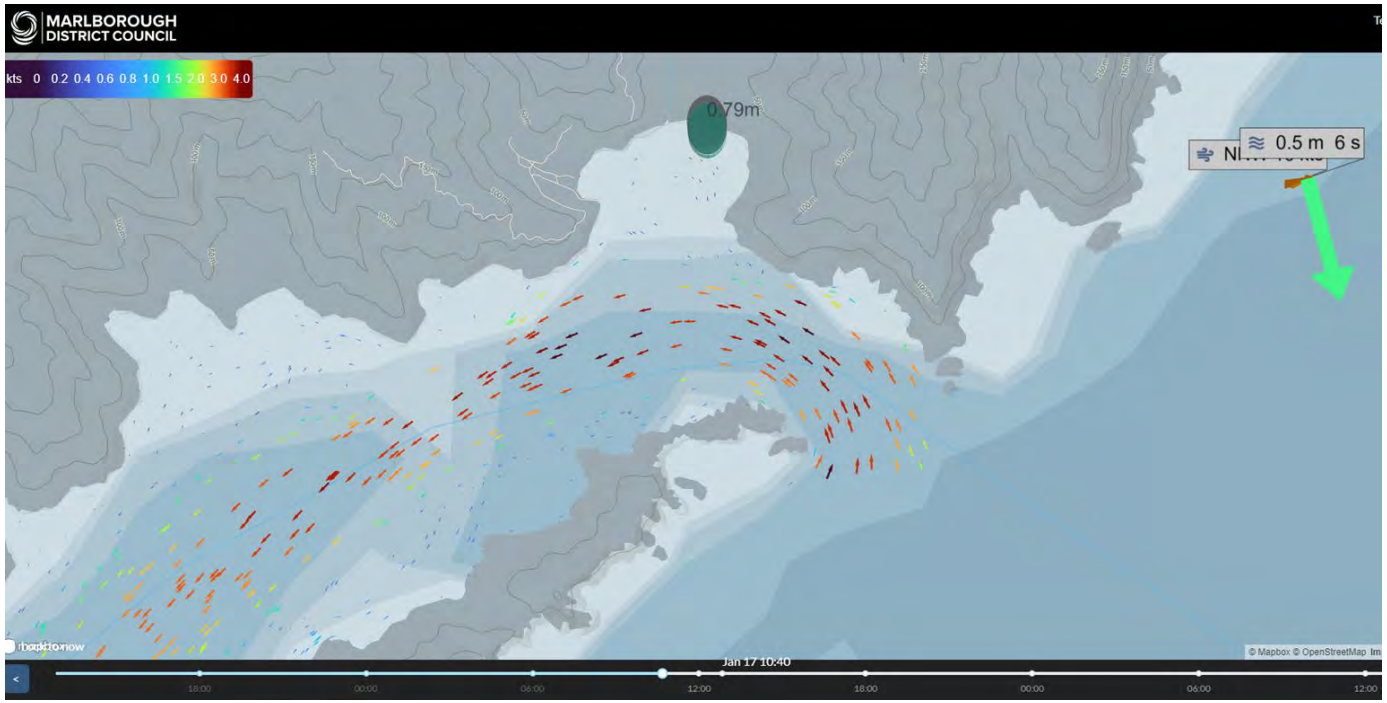
… interrogating huge datasets

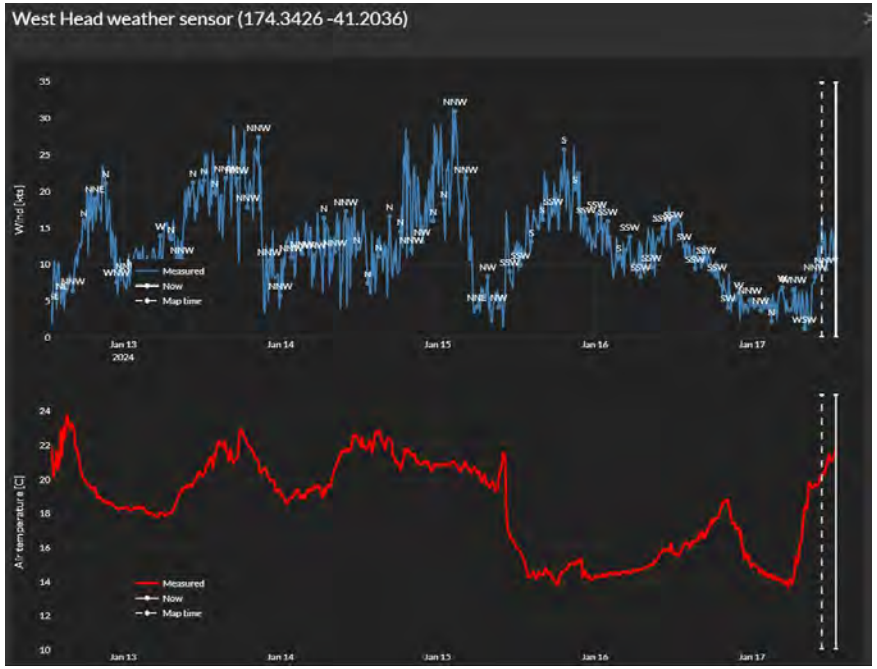
The CMIP6 climate projections are massive datasets that feature many different structures and formats.
In the Datamesh we can register a selection of those experiments and provide easy access to non-expert users.

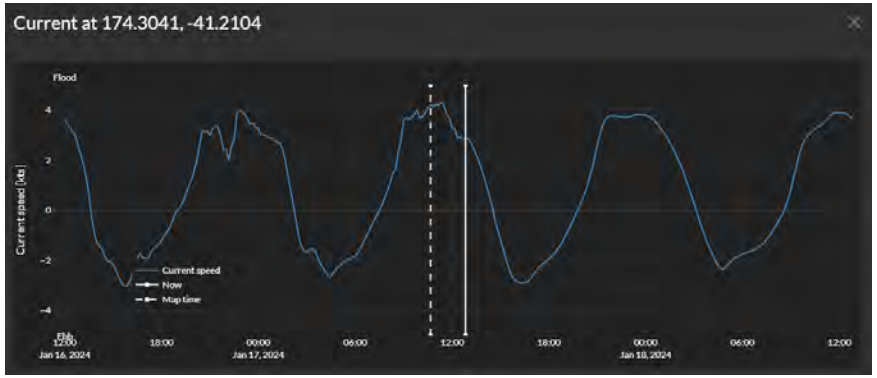
Here we present a plot of surface temperature from 4 CO2 emission scenarios (2015-2100), plus the historical period from 1980 to 2015. Created in a few minutes.



…making real time navigational decisions





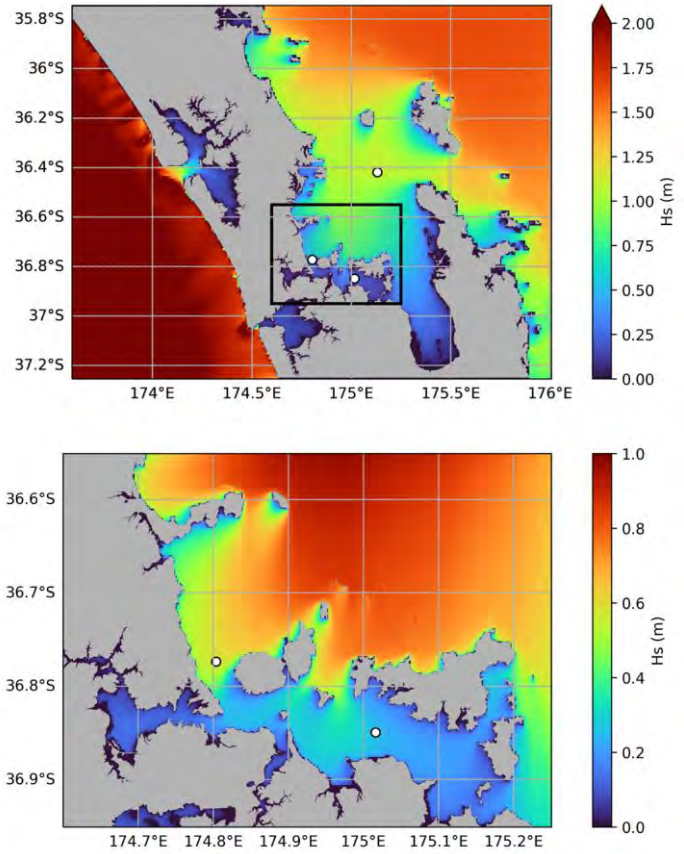


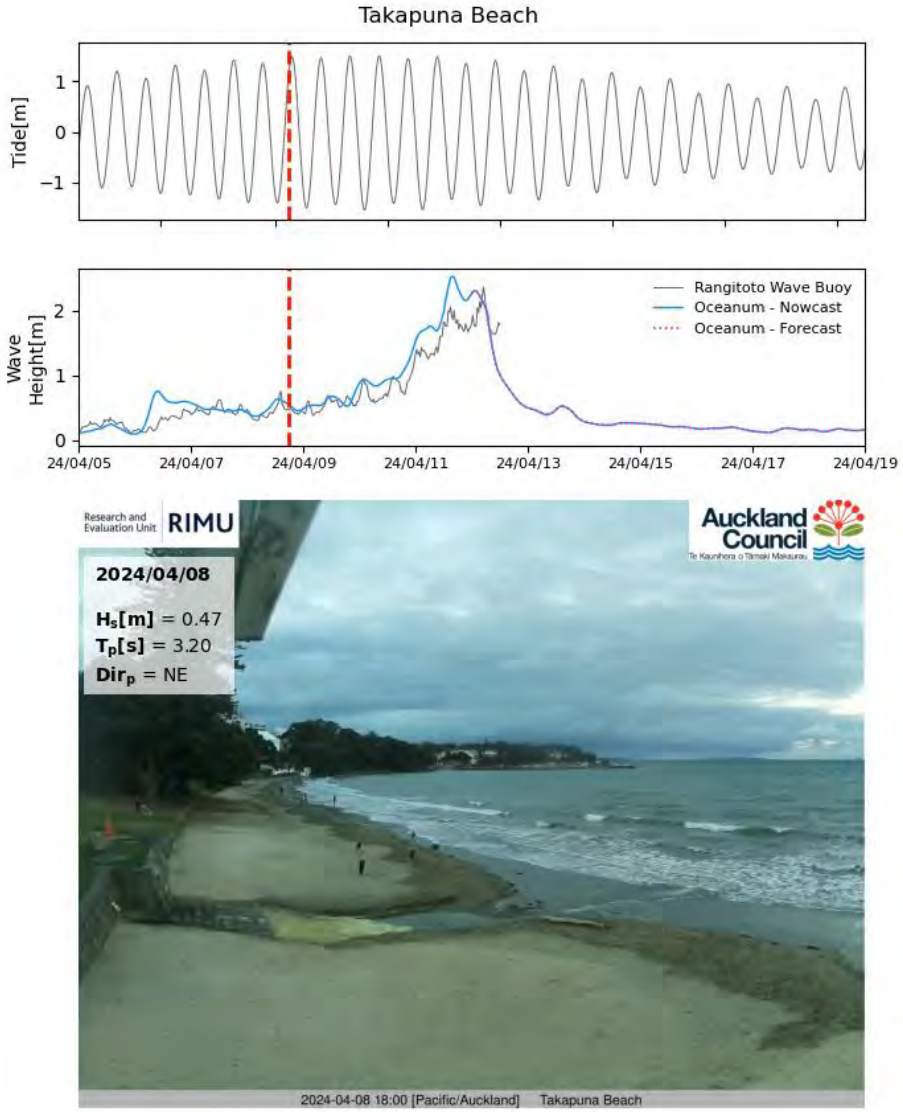
The complex tidal and non-tidal flows in the Tory Channel are resolved by a hybrid ML model using real time water level data.

…monitoring variables in real time

Users can create their own apps by mixing various datasets.

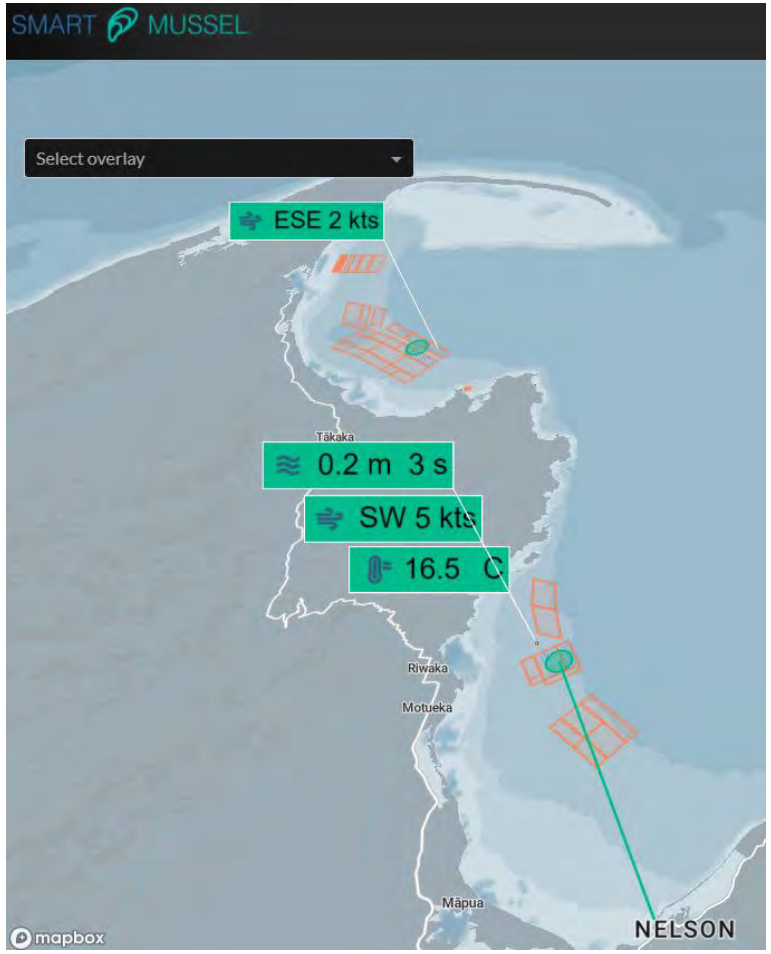
Here, the Auckland Council uses measured, nowcast and forecast wave heights and combine with video observations to monitor beach response to storms.

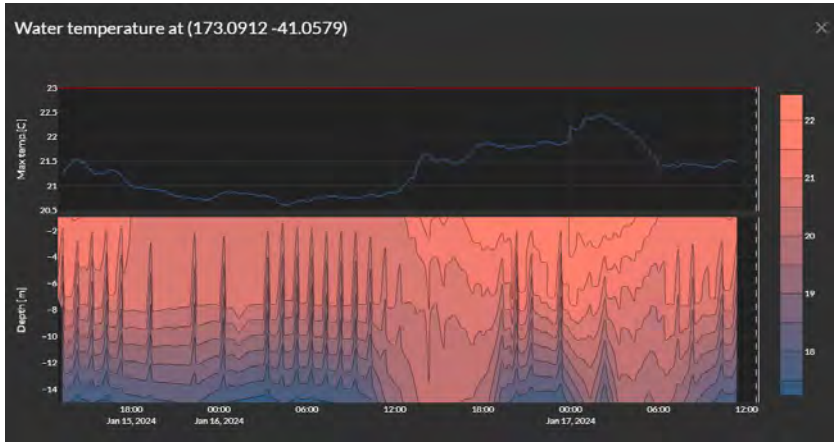


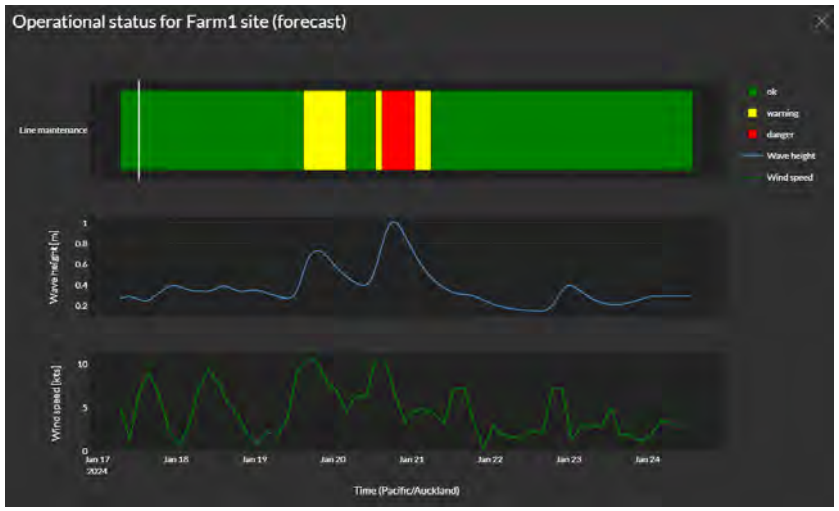


Credit: Jennifer Montano Munoz

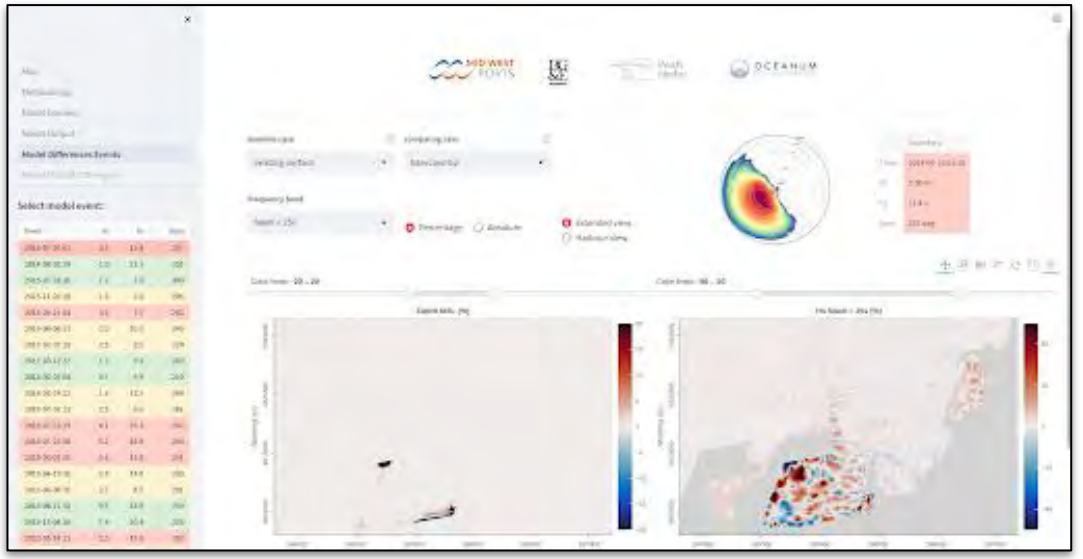
… providing aquaculture with powerful decision-making tools

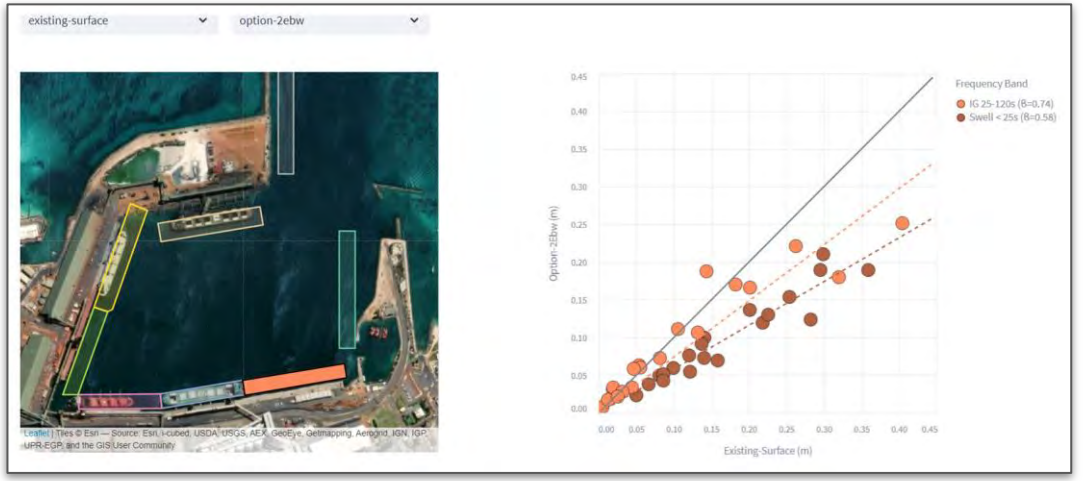






… using interactive apps to present complex model results





Effects of port modifications on the harbour tranquility can be analysed by the range of stakeholders.

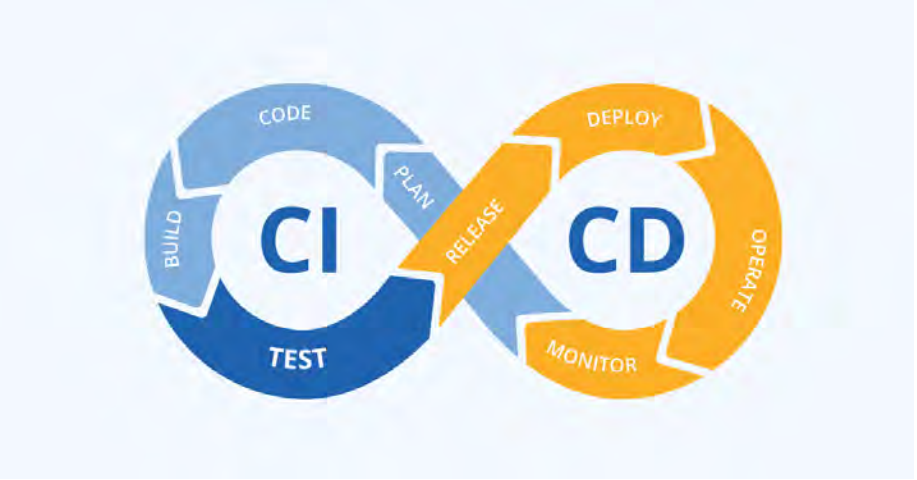
OCEANUM
OCEAN NUMERICAL

OCEANUM.IO features under development….

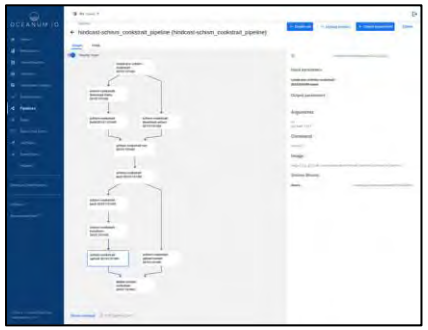
Third-party app deployment pipelines

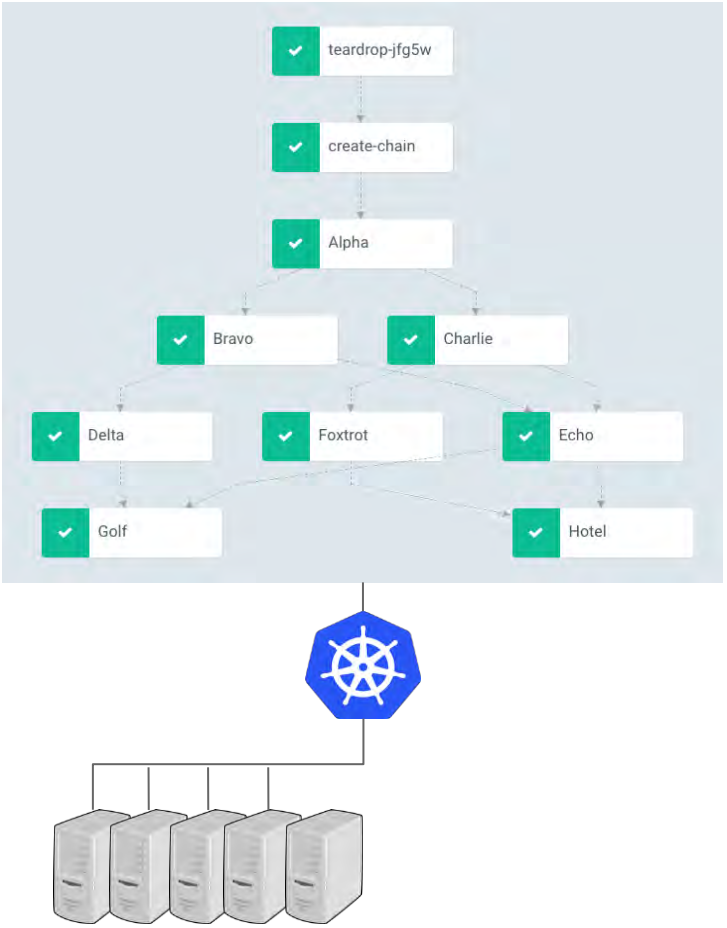
GitHub | GitLab

- Automated provision, building and deployment of Web Apps and API Web services in the cloud.
- Github and Gitlab push events triggers integration (CI/CD).
- OpenID (Google, Email) and Token access Authentication for APIs.
- App authorization policies (open-access, private and sharing).
- Default URL and Custom Domains and with TSL (HTTPS).
- Multiple deployment stages (test, production, etc.).
- Common App templates for quick bootstrapping of new projects (e.g. Streamlit, EIDOS, Dash, etc.).



Third-party access to cloud compute



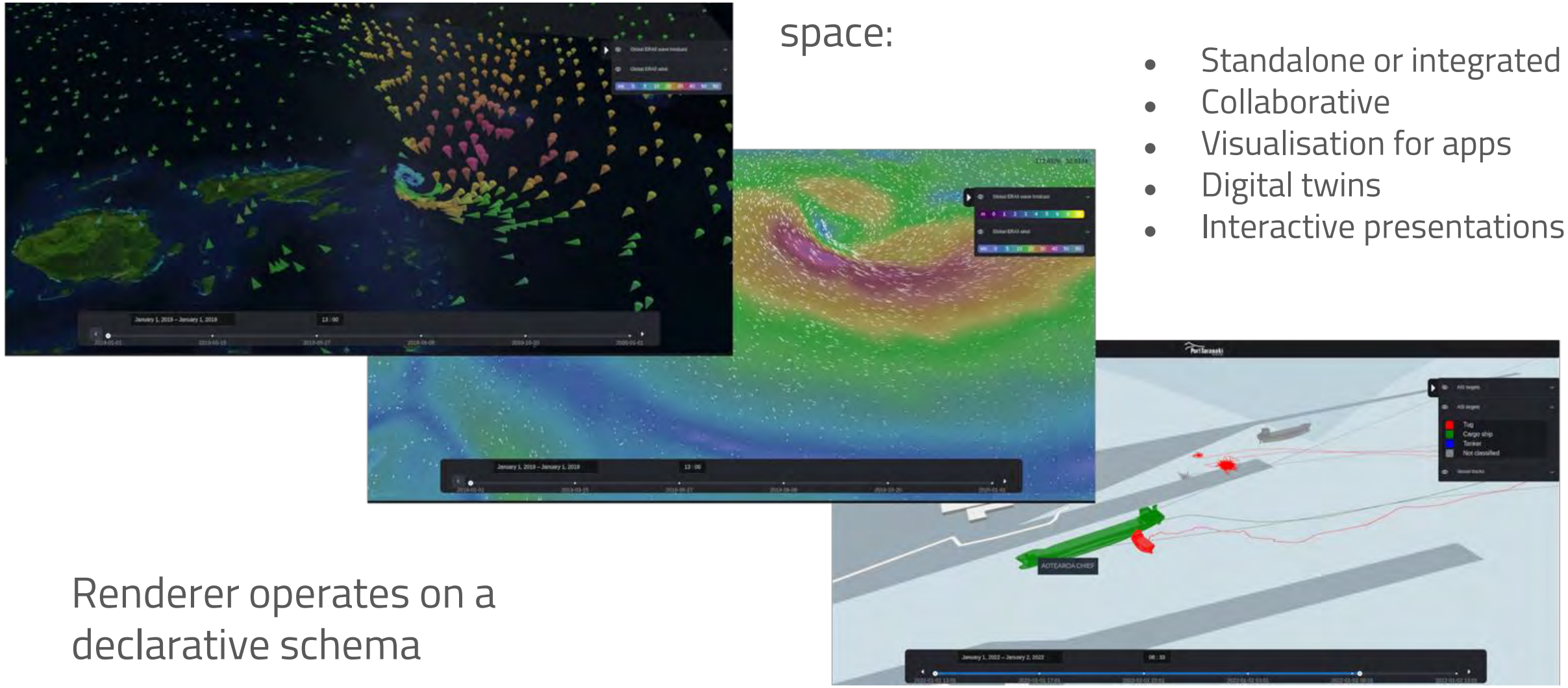


- Cloud-based compute platform for running complex geophysical models and large computational workloads (hindcast, forecast, operational) .
- Using well-established technologies such as Docker and Kubernetes to allow massive scalability in response to user demands.
- Abstracts away the complexity of organising and scaling the compute.
- Simple user interface and command line tools to interact with the platform and visualise the workflows as they run.
- Unleashes the full power of cloud compute, rather than treating the cloud as a ‘remote cluster’.
- Boundaries and outputs managed by Datamesh.

EIDOS (Environmental Interaction and Display Operating System)

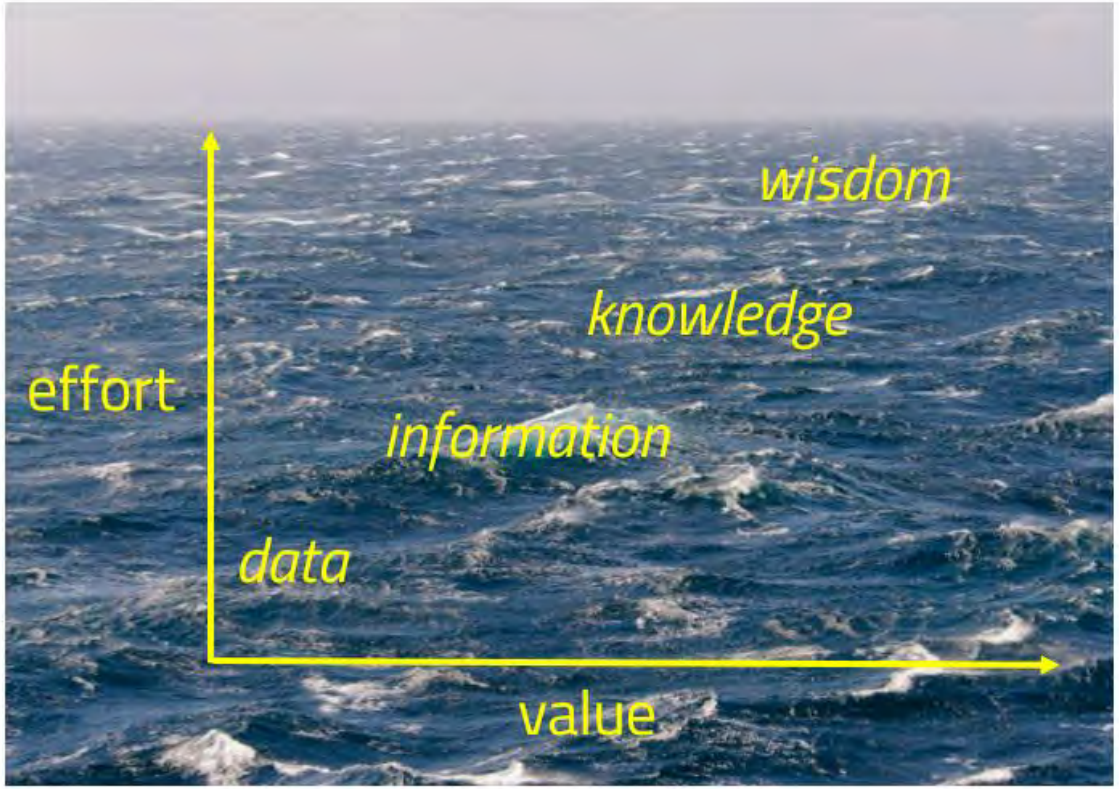
An interactive view of data in time and space:

- Standalone or integrated
- Collaborative
- Visualisation for apps
- Digital twins
- Interactive presentations



Renderer operates on a declarative schema

It all starts with access to data…



context that can only be understood by humans

data that can only be read by machines

OCEANUM
OCEAN NUMERICAL

Thanks for your time

www.oceanum.io

Fisheries New Zealand

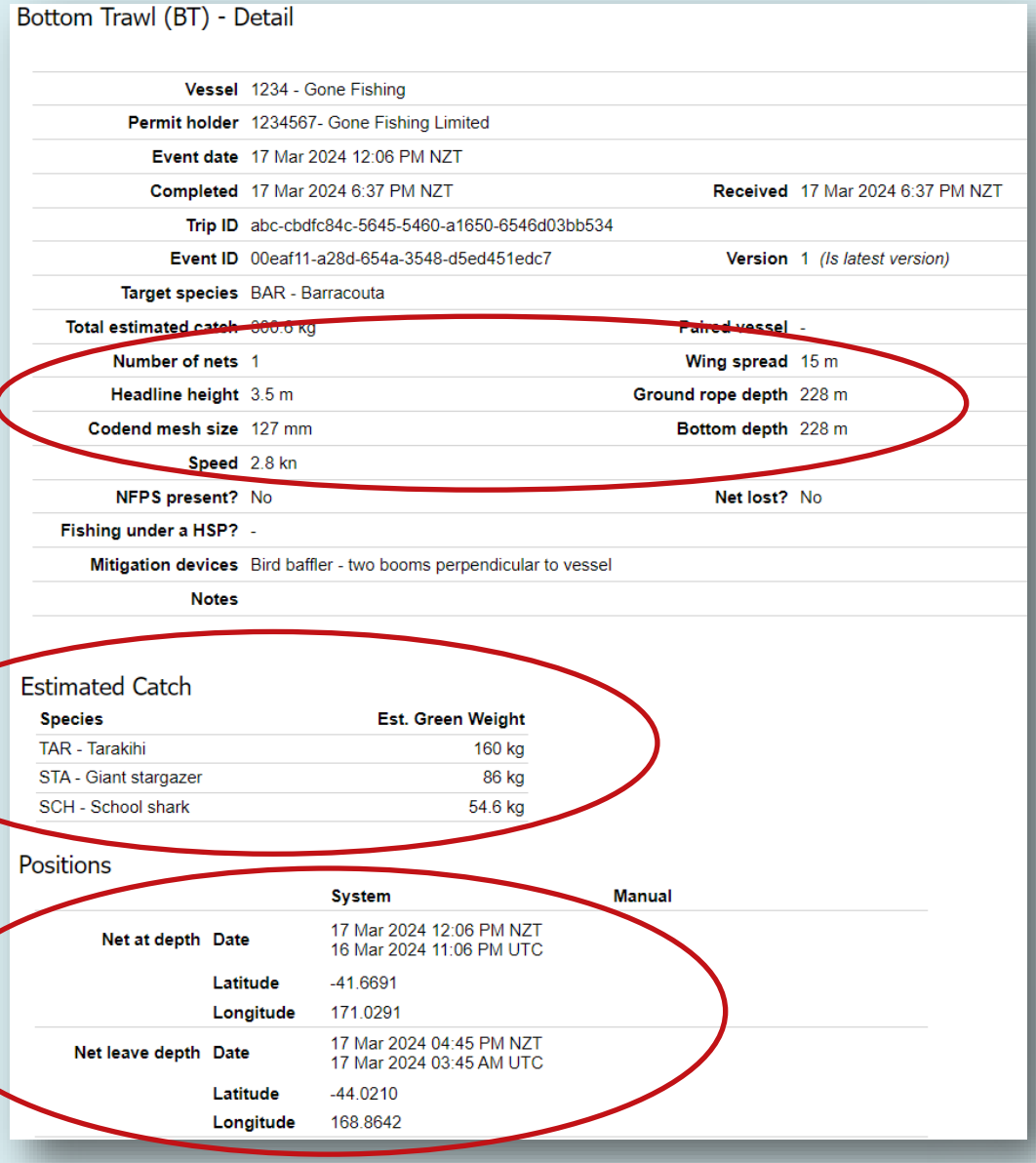
Tini a Tangaroa

Improvements in the mapping of commercial fishing effort

Riki Mules – Spatial Intelligence – Ministry for Primary Industries – Mānatu Ahu Matua

Fisheries Reporting

- Fisheries reporting switched to electronic reporting in 2018-19
- Fishing events now provide more information
- We needed to figure out how to map this new information…



Bottom Trawl (BT) - Detail

Vessel	1234 - Gone Fishing		
Permit holder	1234567- Gone Fishing Limited		
Event date	17 Mar 2024 12:06 PM NZT		
Completed	17 Mar 2024 6:37 PM NZT	**Received**	17 Mar 2024 6:37 PM NZT
Trip ID	abc-cbdfc84c-5645-5460-a1650-6546d03bb534		
Event ID	00eaf11-a28d-654a-3548-d5ed451edc7	**Version**	1 *(Is latest version)*
Target species	BAR - Barracouta		
Total estimated catch	300.6 kg	**Paired vessel**	-
Number of nets	1	**Wing spread**	15 m
Headline height	3.5 m	**Ground rope depth**	228 m
Codend mesh size	127 mm	**Bottom depth**	228 m
Speed	2.8 kn		
NFPS present?	No	**Net lost?**	No
Fishing under a HSP?	-		
Mitigation devices	Bird baffler - two booms perpendicular to vessel		
Notes			

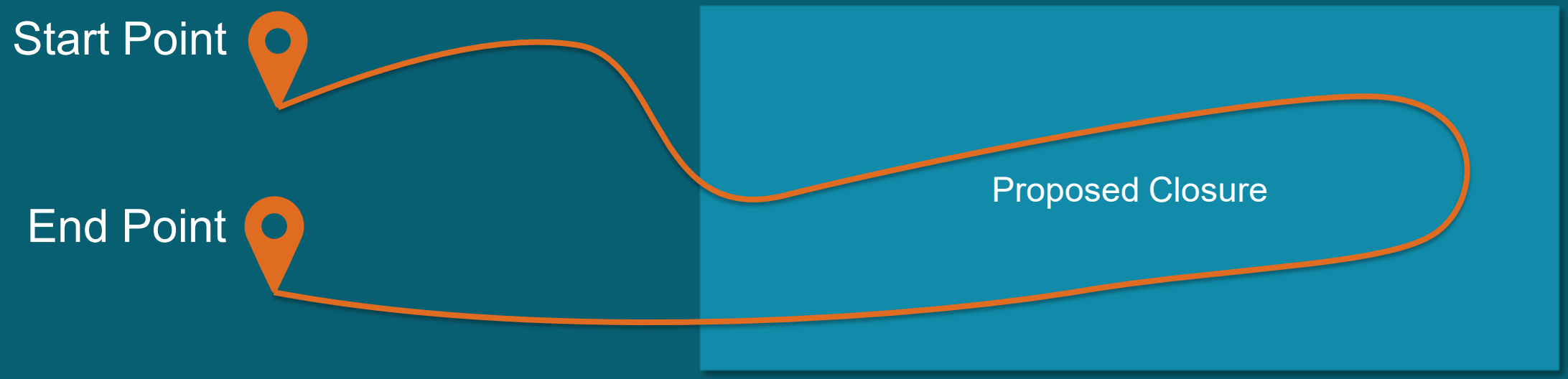
Estimated Catch

Species	Est. Green Weight
TAR - Tarakihi	160 kg
STA - Giant stargazer	86 kg
SCH - School shark	54.6 kg

Positions

		System	Manual
Net at depth	**Date**	17 Mar 2024 12:06 PM NZT 16 Mar 2024 11:06 PM UTC	
	Latitude	-41.6691	
	Longitude	171.0291	
Net leave depth	**Date**	17 Mar 2024 04:45 PM NZT 17 Mar 2024 03:45 AM UTC	
	Latitude	-44.0210	
	Longitude	168.8642	

Point locations tell you something happened, they don't tell you exactly **where and how** it happened!

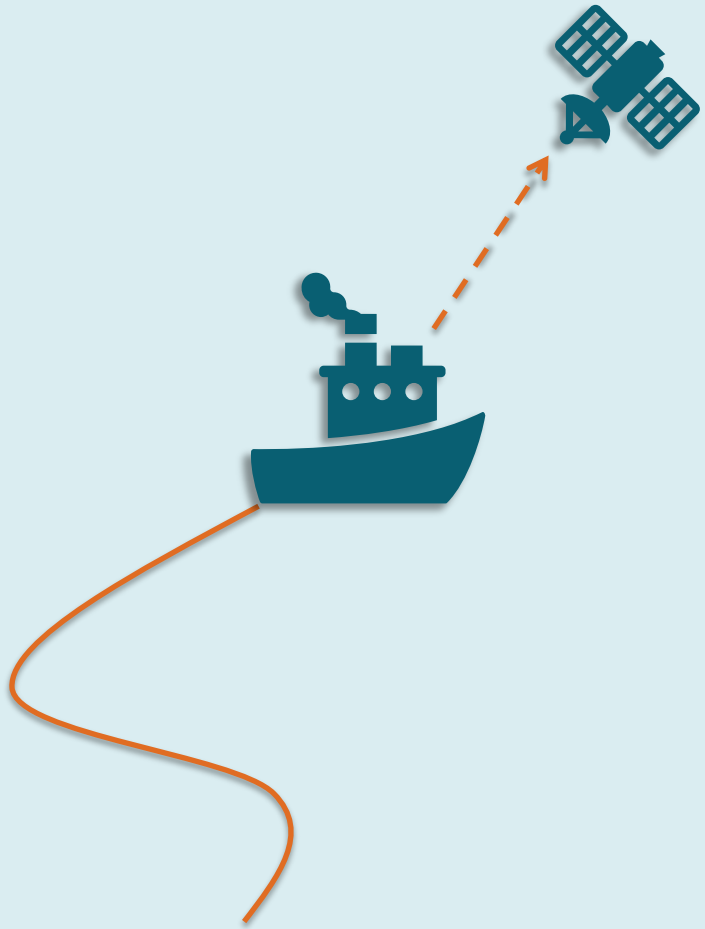


Fisheries New Zealand
Tini a Tangaroa

What other information can we use?

Geospatial Position Reporting (GPR) is an in-house system used to monitor fishing vessels

GPR provides vessel locations at regular intervals (i.e., like AIS)



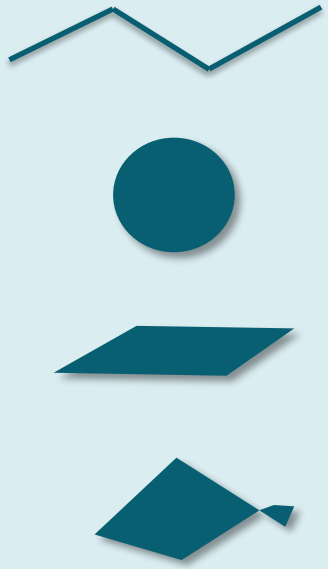
Can GPR fill the gaps in fishing effort returns?

How do vessel tracks relate to different fishing methods?

Mapping Improvement Project

- We looked at every fishing method
- Reviewed the reported information and how that related to the fishing gear
- Developed processes to map the reported details
- Received feedback from the Aquatic Environment Working Group, fishers, FNZ staff

The standards called for 4 types of geometry



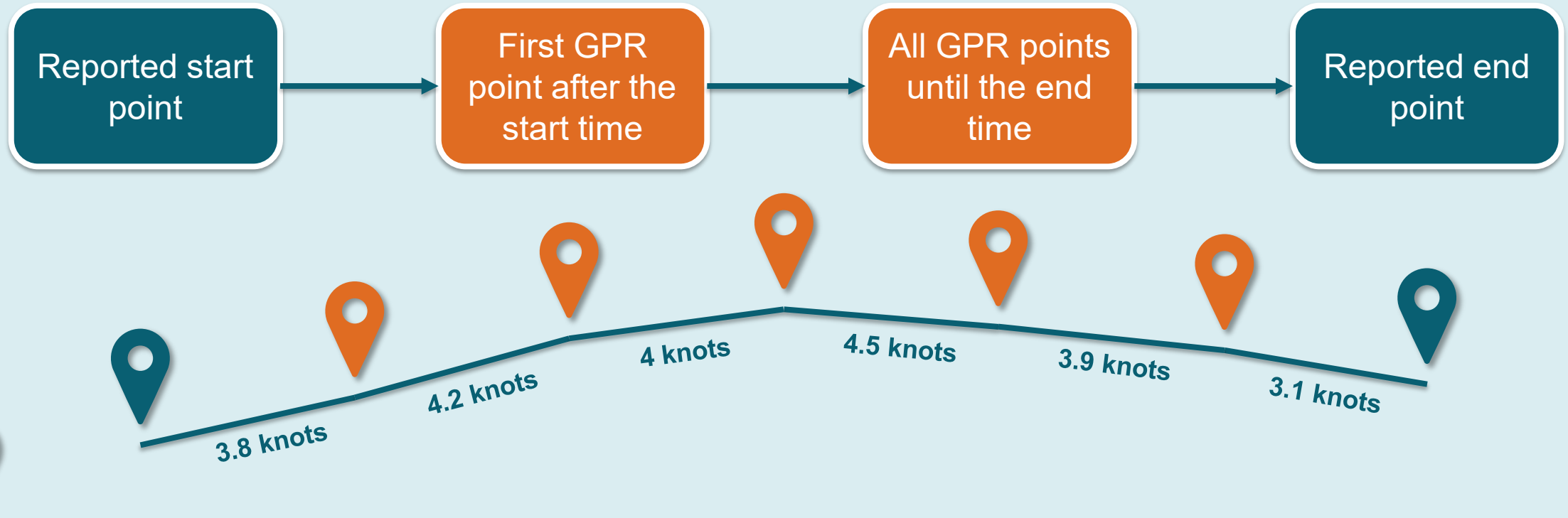
Track lines
Trawl, Potting, BLL etc.

Circles
Seining, Mechanical Harvesting etc.

Surface Longline

Danish Seine

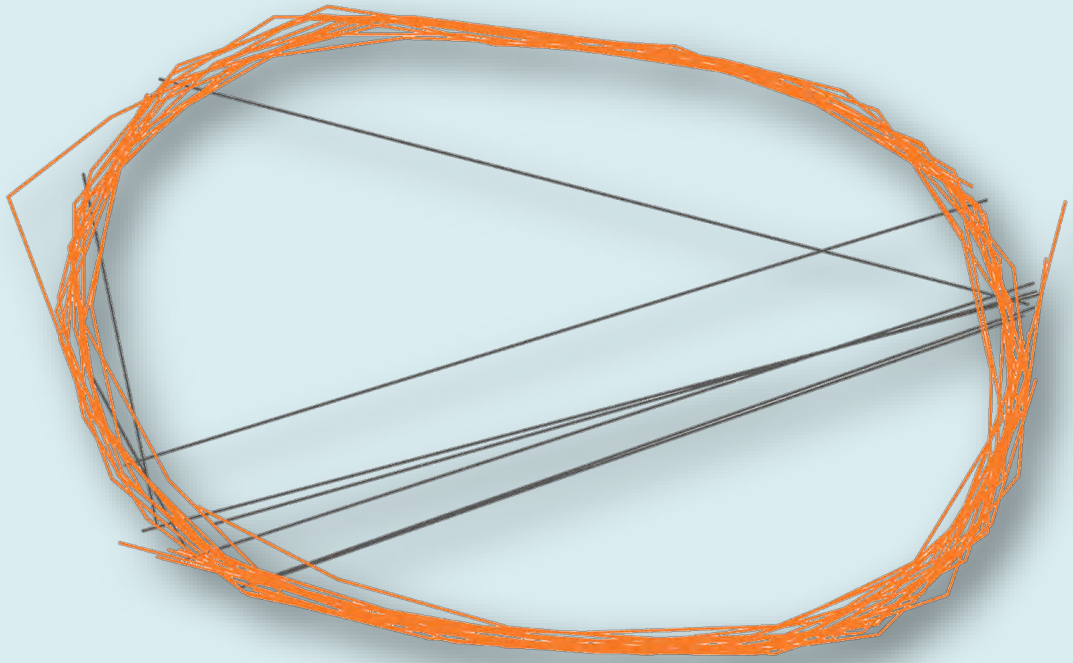
Creating Track Lines



Using speed for data grooming

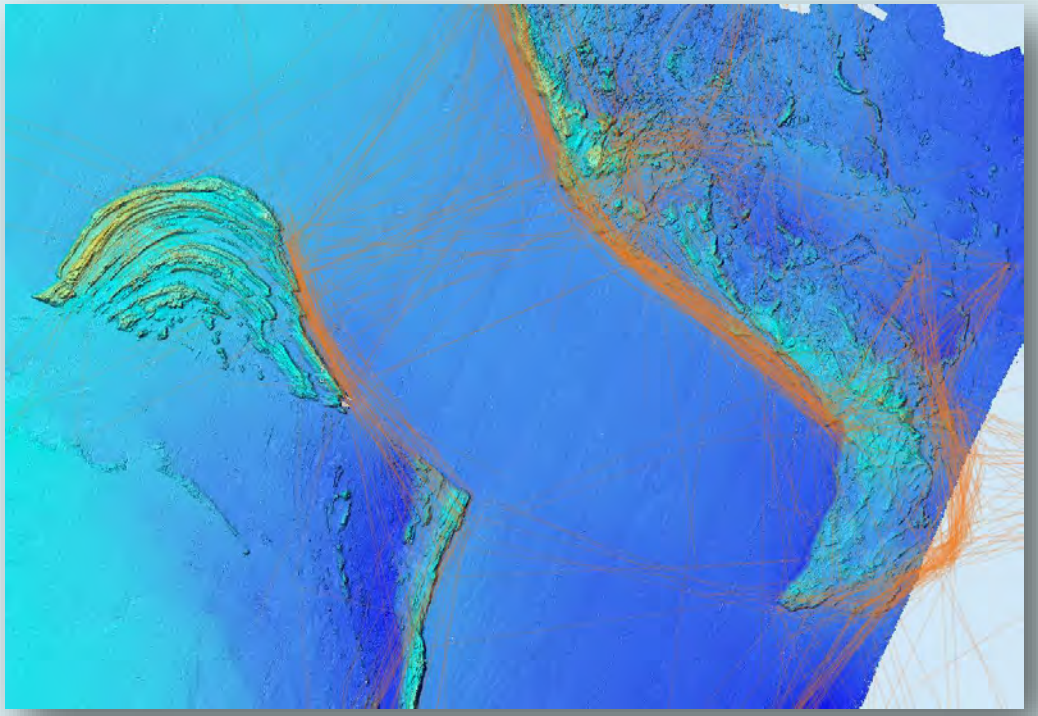
- Some fishing methods have granular reporting
- Vessel speed can highlight fishing locations
- Speed can be used to remove errors in reported locations

Track Lines



GPR Fishing tracks

Straight line version



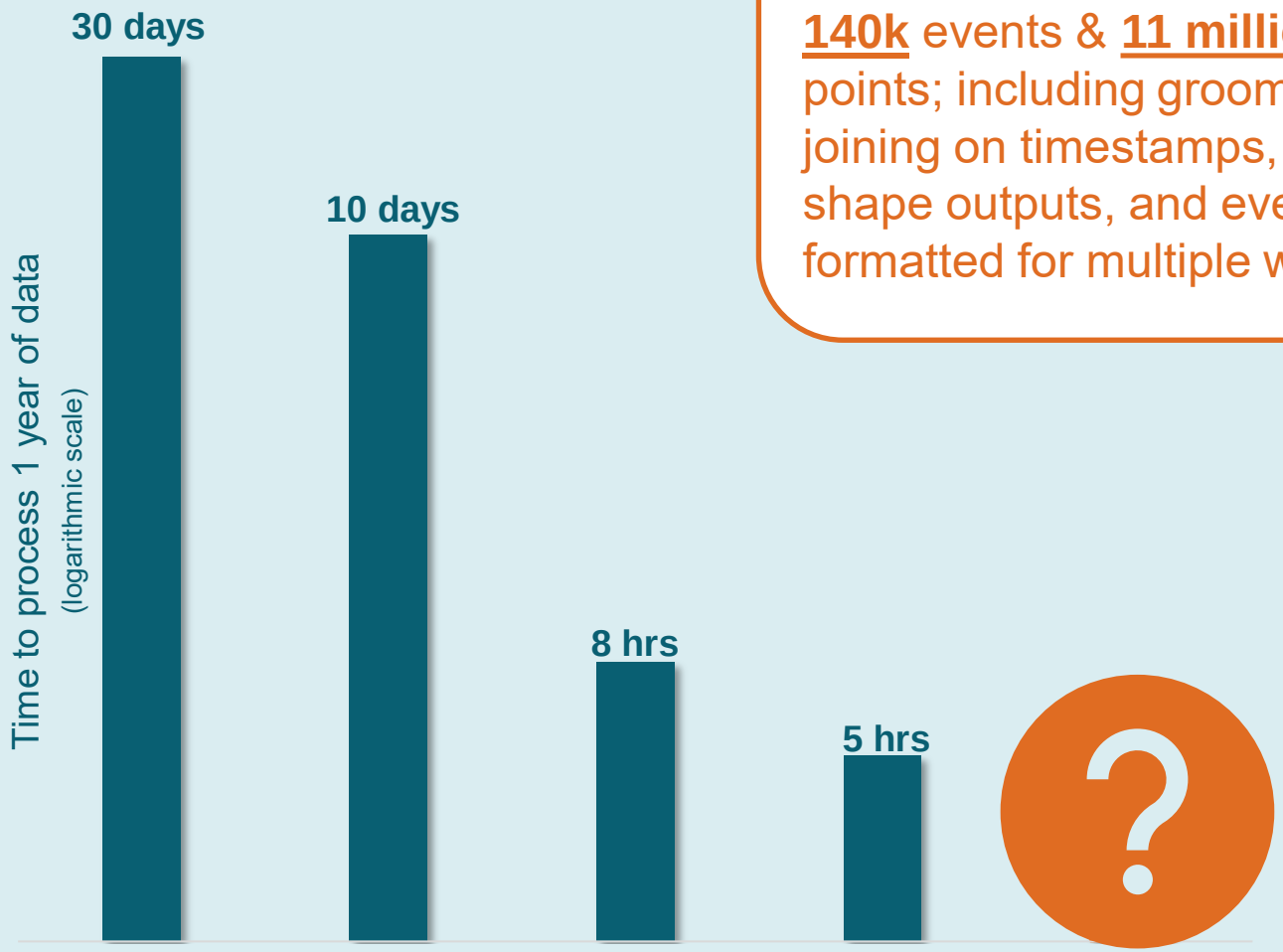
Potting relative to reefs

Key changes over time

Each bar represents a major improvement to our processing scripts

Past examples only processed **trawl** records (**60k events**)

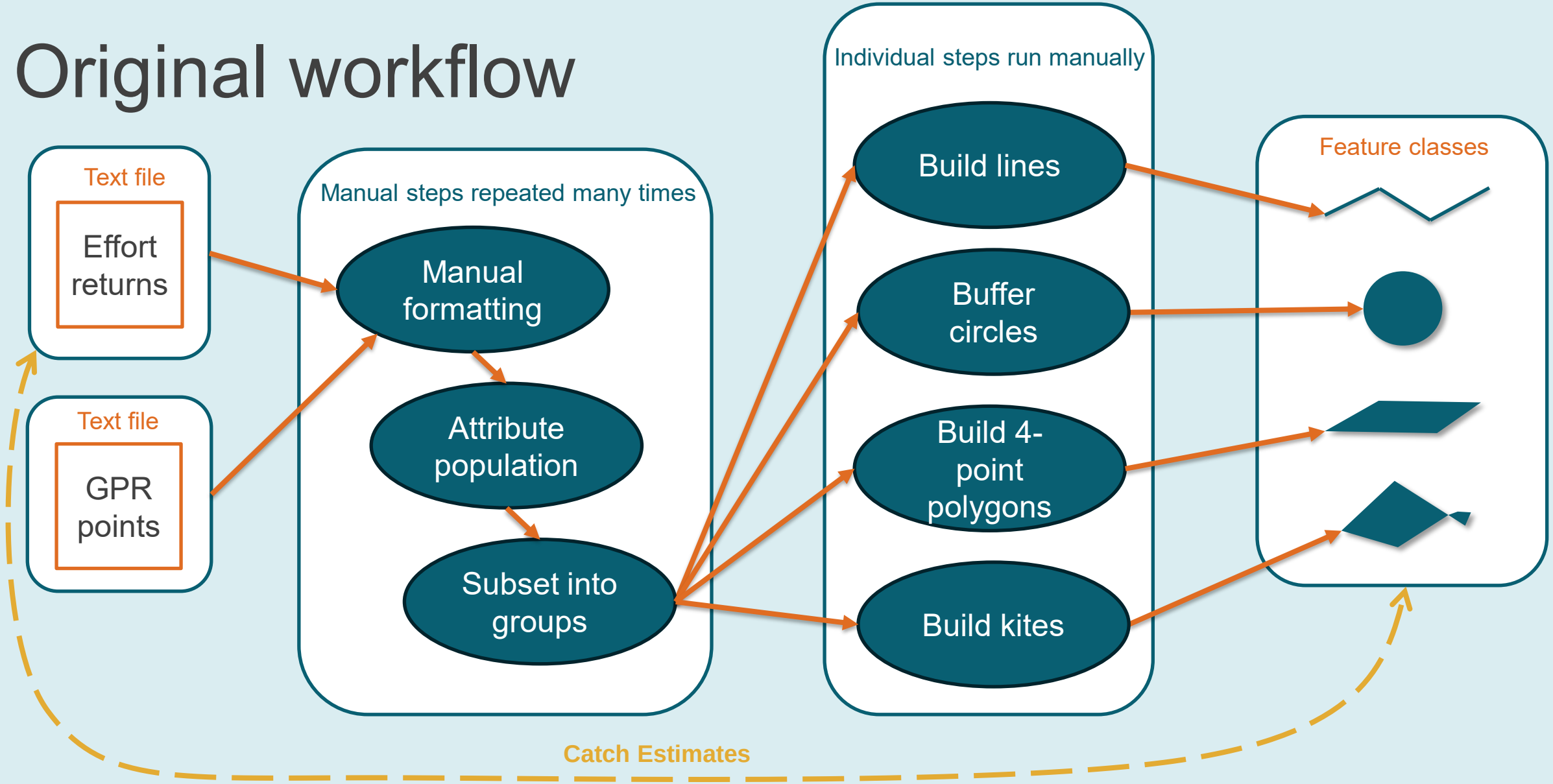
Large complex projects took weeks to complete



We can now process everything!

140k events & **11 million** GPR points; including grooming, joining on timestamps, multiple shape outputs, and everything is formatted for multiple workflows

Original workflow



What is pandas?

pandas is a python library for managing tabular data

Provides tools to filter, analyse and join data – like Excel but much faster

Included with ArcGIS Pro – no special installs needed

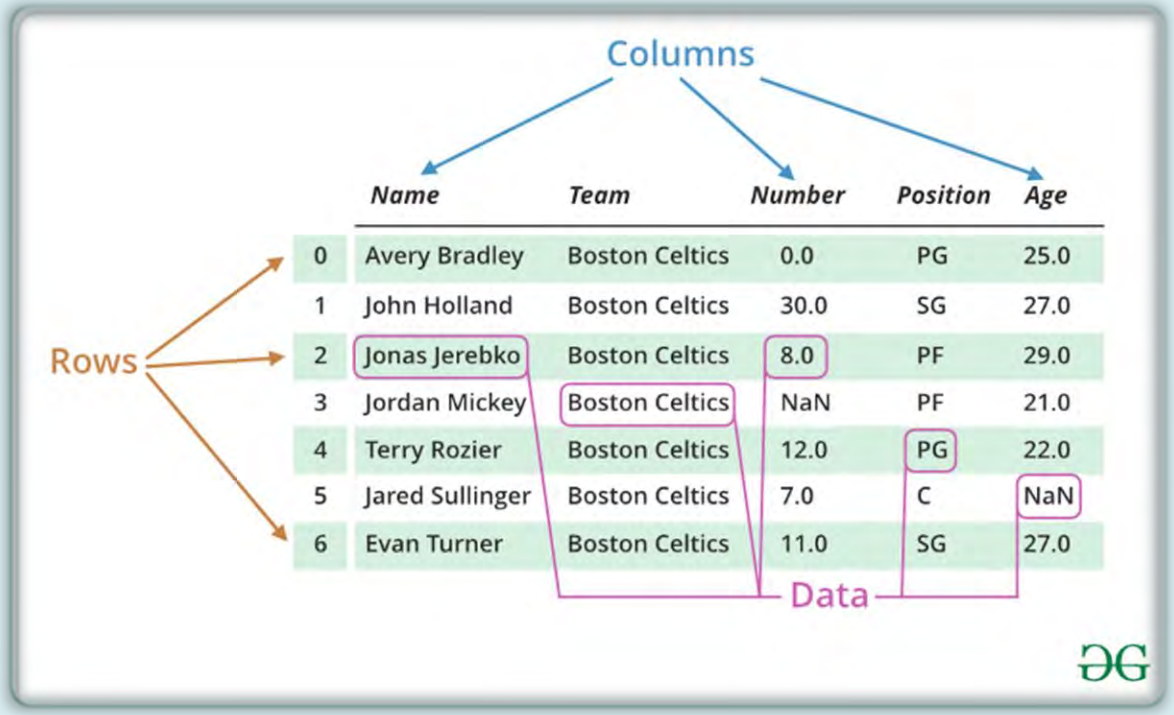
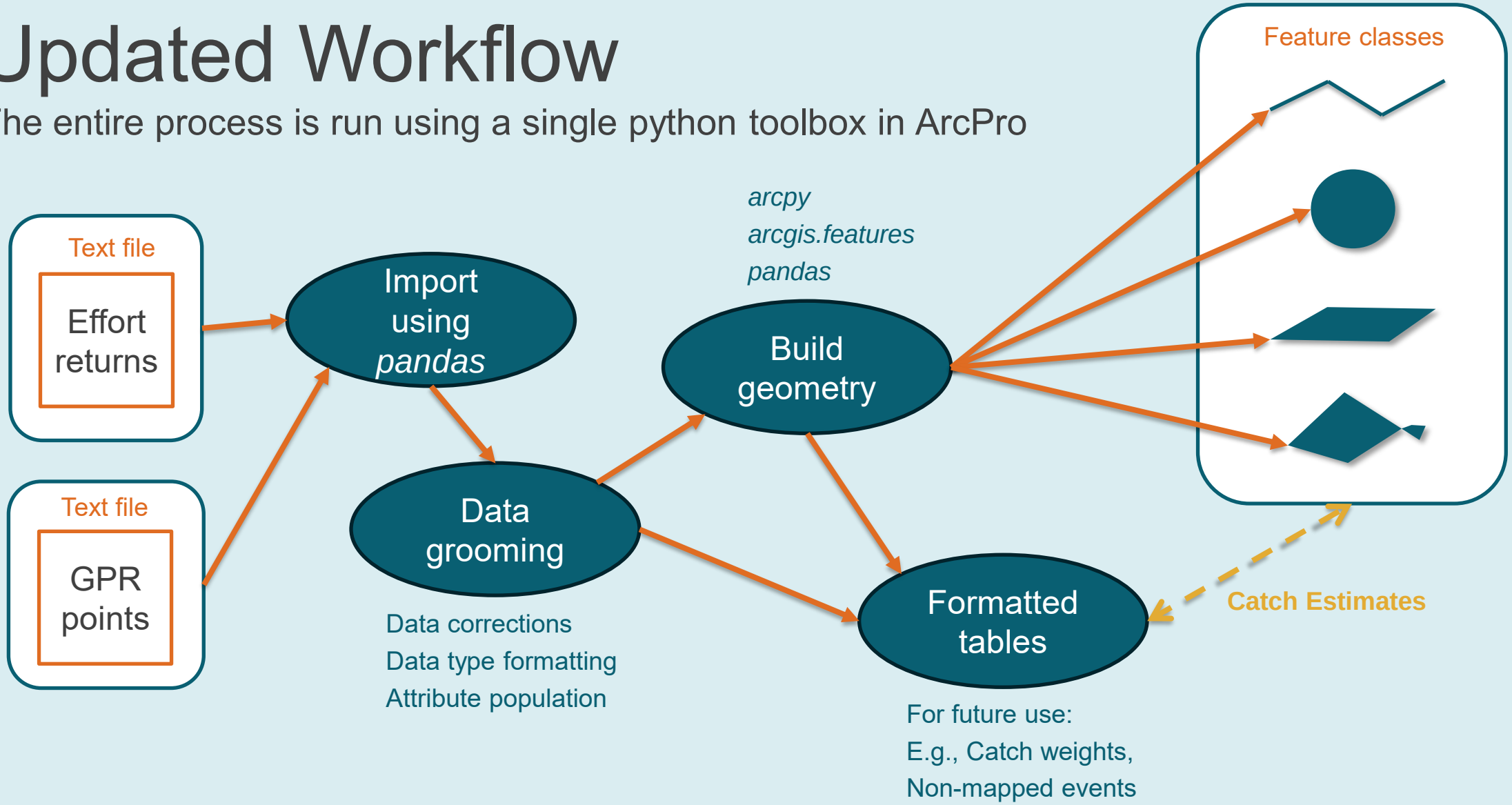


Image: https://www.geeksforgeeks.org/python-pandas-dataframe/

Updated Workflow

The entire process is run using a single python toolbox in ArcPro



Benefits of the new process

Makes better (and timely) use of the data

Greater certainty of where fishing is occurring

Higher quality advice for decision making

Other possibilities…

- Habitat identification
- Change predictions
- Fisher / environment interactions

Thank you

Thanks to the Spatial Intelligence-Water Team, Fisheries NZ staff, and Rātā Chapman-Olsen

riki.mules@mpi.govt.nz

Fisheries New Zealand

Tini a Tangaroa

Electronic Navigational Charts and ArcGIS Maritime Server:

Revealing the potential of the LINZ ENC Service beyond navigation

Richard Wells - GEOINT New Zealand, New Zealand Defence Force
John Plunkett - Eagle Technology
April 2024

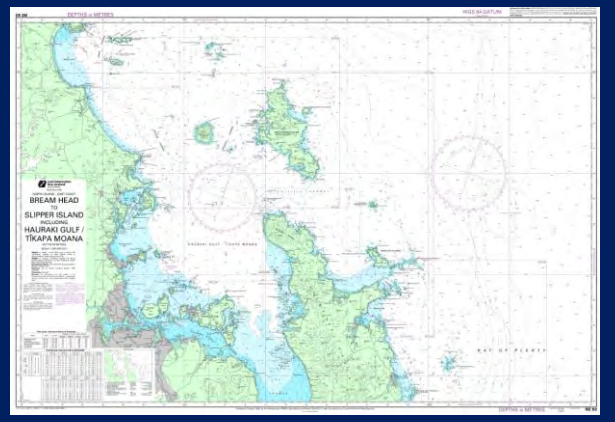
EAGLE TECHNOLOGY

esri Official Distributor

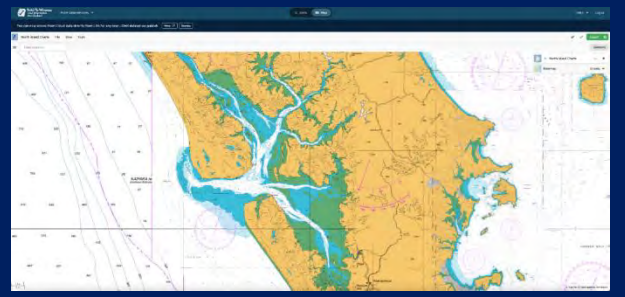
Electronic Navigational Charts (ENCs) and the LINZ ENC Service

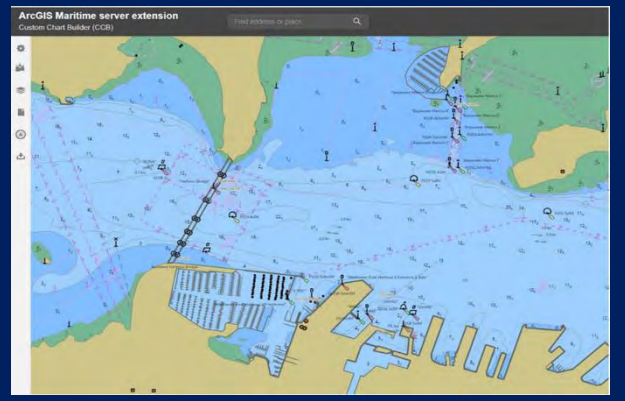
- Introduction and Background: The journey so far
- Hydrographic Charting
  - Background/History

  (first recorded hydrographic charts were produced c. 100 A.D. - *Marinus of Tyre, Greek-speaking Roman Geographer*)
    - Paper - > Raster - > Vector (ENC)
  - Primary Purpose
    - Safety of Navigation at Sea



- Electronic Navigational Charts (ENC)
  - Vector Charts required for Electronic Chart and Display and Information Systems (ECDIS)
  - Since 2011, an ECDIS has been required by International Maritime Organisation (IMO) regulations to be fitted to all large commercial vessels travelling internationally
  - New Zealand Maritime Rules Part 25
  - ENC S-57 standard developed by the IHO (International Hydrographic Organisation)
  - Data Content: Soundings, Contours, Buoys, Beacons, Lights, Coastline etc.
  - 6 x Usage/Scale Bands [Overview (1), General (2), Coastal (3), Approach (4), Harbour (5) Berthing (6)]
  - ENC format: .000 S-57, [S-63 (protection/encryption)]





"Electronic Navigational Charts (ENCs) consist of digitised data conforming to the IHO's S-57 ENC Product Specification that records all the relevant charted features necessary for safe navigation, such as coastlines, bathymetry, buoys, lights, etc. The basic unit of geographic coverage (analogous to a paper chart) is termed a cell.

ENCs are official vector-based electronic charts designed to meet the relevant chart carriage requirements of the Safety of Life At Sea (SOLAS) convention. When displayed within certain parameters, and using a type approved ECDIS, ENCs fully satisfy SOLAS chart carriage requirements, and so can be used as the primary means of navigation." IHO Publication S-65, Edition 2.1.0, May 2017

Electronic Navigational Charts (ENCs) and the LINZ ENC Service

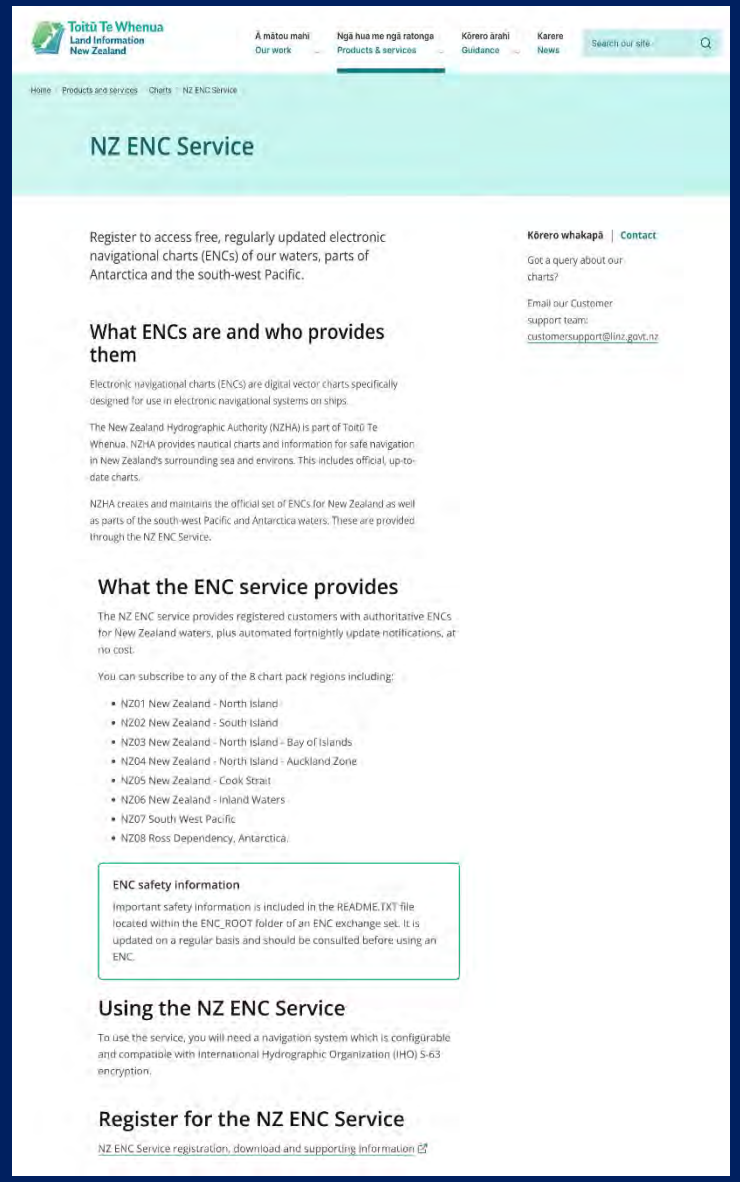
- LINZ ENCs
  - RNZN ENCs (~c.2005-2008) -> adopted by LINZ and became NZ's official ENC portfolio
  - LINZ ENCs made available through Regional ENC Coordinating Centres

- The LINZ ENC Service (launched 2020) – free and publically available service

https://encservice.linz.govt.nz

  - S-63 Permit
  - Chart Permits
  - Base Disk (6 monthly)
  - Fortnightly updates

  - Requires a system that can read S-63 protected ENCs (typically an ECDIS)



NZ ENC Service

The New Zealand Hydrographic Authority provides free of charge Electronic Navigational Charts (ENCs) for Mariners. Covering New Zealand, the South West Pacific and Antarctica.

All enquiries please email: encservice@linz.govt.nz

Read more about the NZ ENC Service

How to get started

Download Charts and Updates

Useful Information

- → Guide to NZ ENC permits.
- → Guide to installing your NZ ENCs.
- → Guide to Access Permit Files
- → Guide to NZ ENC Permit
- → Guide to installing your NZ ENCs

New Zealand Maritime Rules

- → Maritime Rules Part 25

CC BY

ArcGIS Maritime Server – LINZ ENC Service Demonstration

Demonstration Link:

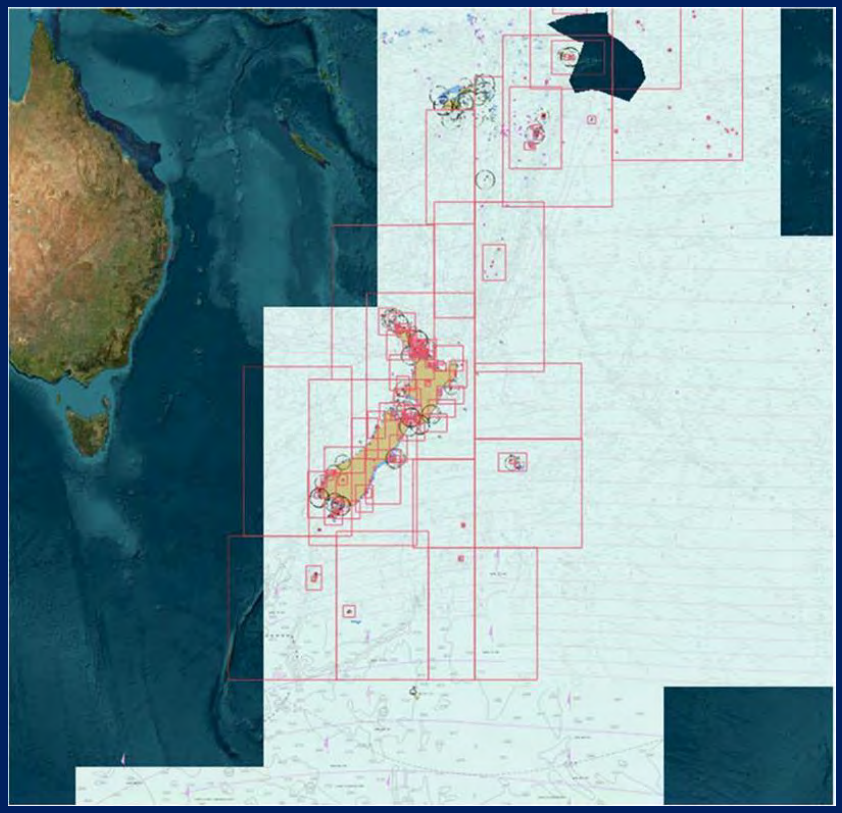
https://jfp1091.cloud.eaglegis.co.nz/portal/apps/mapviewer/index.html?webmap=520d8b81b6c34d4d92729f8933490351

LINZ Raster Charts Comparison

https://www.arcgis.com/apps/mapviewer/index.html?webmap=a50e6165d8e34cb486bff2242f261c6e

Demonstration Content:

- Seamless service (~2-300 ENCs) (multiple scales/usage bands and extents)
- Ease of updating (fortnightly)
- Symbology – INT1 and S-52
- Layer effects – turning on/off features and applying transparency
- Comparison with Raster Charts
- Integration with other data:
  - Bathymetry
  - Imagery
  - Boundaries
  - Infrastructure
- Custom Chart Builder



Advantages of the ENC Maritime Chart Service

- **Currency of the data**
  - The data is updated fortnightly with Notices to Mariners by LINZ. The raster chart (image) data available from the LINZ Data Service is updated only periodically. NZMariner Raster navigational chart products have been sunsetted
- **Coverage**
  - It provides current coverage for all areas where LINZ is the Primary Charting Authority (including Ross Dependency and many SW Pacific Islands)
- **Clarity**
  - Vector data is able to be displayed at multiple scales (rather than raster chart products, which only lend themselves to particular scales)
- **Symbology**
  - S-52 or INT1 (paper-chart-like) symbology options
- **Data Consistency across the Maritime Community**
  - The data is identical to that being used by the Maritime Navigation Community on board commercial vessels with display being very similar to that on a ship's ECDIS using S-52 symbology.
- **Layer control**
  - Enables layers to be turned on/off dynamically
- **Data Integration**
  - Ability to integrate vector features with other datasets more easily than a raster backdrop (ability to pick and choose layers to display, query features, etc.).
- **S-100 Support**
  - The service can be updated to incorporate new developments in IHO charting standards (e.g. the S-100 family of hydrographic products, which are due for release from 2026). Esri ArcGIS Maritime Supports S-100.

Potential Use Cases of a LINZ ENC Maritime Chart Service

- Integrating with AIS Data – providing situational awareness

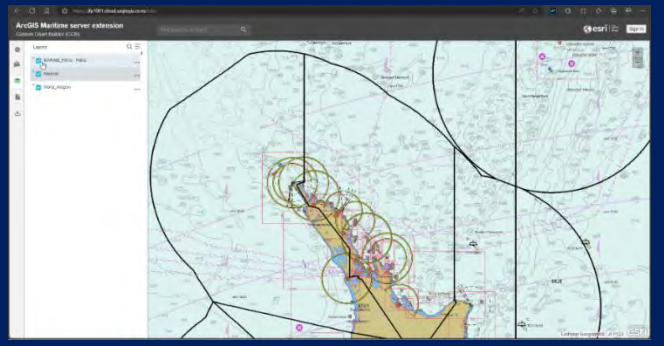
- Integrating with overlays such as:
  - Maritime Boundaries
  - MNZ Operating Limits
  - NABIS (National Aquatic Biodiversity information System)
    - Fisheries Management Areas
    - Conservation Areas
    - Customary Rights

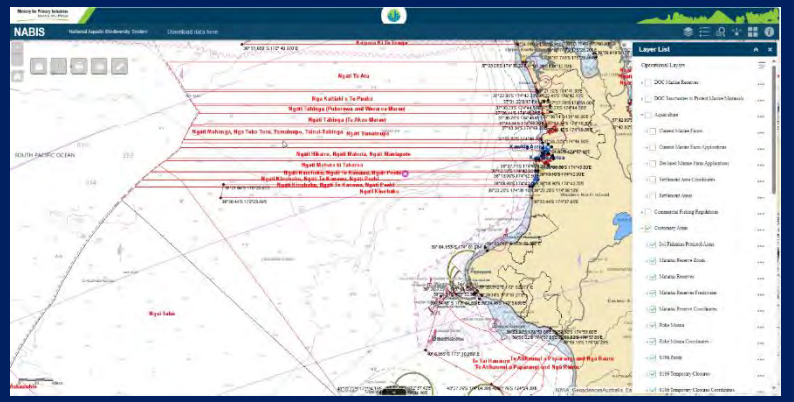
- Integration with Bathymetric Data

- Integration with Imagery
  - For infrastructure – e.g. Ports
  - For Coastal Bars to highlight hydrographic features with sand-bar locations (e.g. to help illustrate and educate recreational boat users)

- Facilities and infrastructure management
  - Ports, Undersea Cables, Pipelines, Offshore Wind-farms

- Exploration





Conclusion

- **Aim has been to demonstrate the potential of the LINZ ENC Service for use in applications beyond navigation**

- The Pilot Study has combined:
- LINZ ENC Service: Mature, Comprehensive, Authoritative National Hydrographic Dataset, which is updated fortnightly
- Esri ArcGIS Maritime Server: Mature and well-proven technology (as used by NOAA (~2015) and UKHO (2019))

- **Where next?:**
- GNZ – is evaluating implementing ArcGIS Maritime Server on NZDF networks, for planning and situational awareness applications: Integrating National (LINZ) ENCs, International ENCs, Maritime Boundaries, AIS, Additional Military Layers (AMLs), Exercise Areas

- Raising awareness of the potential of the LINZ ENC Service being published online as a National Maritime Base Map service to:
    - All of Government organisations e.g.
        - LINZ
        - Maritime New Zealand
        - National Maritime Coordination Centre (e.g. as a maritime base layer for the proposed Data Fusion System (DFS))
            - (DoC, NZP, Customs, EPA, MPI, MBIE, MNZ, NZDF)
    - The broader maritime community (MGI WG)

- Collating feedback and providing it to LINZ to shape further discussions on options for the provision of a National Maritime Base Map

Feedback

- Please provide feedback to:

- richard.wells@nzdf.mil.nz
- john_plunkett@eagle.co.nz

LINZ ENC Service:

- ENCService@linz.govt.nz
- https://encservice.linz.govt.nz/contact

Additional Slides

Electronic Navigational Charts and ArcGIS Maritime Server: Revealing the potential of the LINZ ENC Service beyond navigation

Abstract:

Electronic Chart Display and Information Systems (ECDIS) and Electronic Navigational Charts (ENCs) have been used for Maritime Navigation for over two decades and since 2011, it has been mandatory for all new large vessels to be fitted with ECDIS under the International Maritime Organisation's International Convention for the Safety of Life at Sea (SOLAS) regulations. GNZ has been supplying National and International ENCs to the Royal New Zealand Navy for navigation purposes for almost 20 years, but due to the S-63 data protection (encryption) used in these products, their use has largely been limited to navigation systems rather than "Situational Awareness" and GIS applications.

In 2020, LINZ released its National ENC Service, providing freely available (but protected) S-63 ENC-data for navigational use. Prior to this, LINZ's ENCs were available for navigation only through Regional ENC Coordinating Centres (RENCs) for a licencing fee. LINZ is one of only a very few hydrographic organisations to provide their ENCs openly at no cost, and the introduction of the service prompted GNZ to re-visit the wider use of ENC datasets beyond navigation and explore software solutions for consuming and serving ENCs. In 2023, discussions were held between GNZ, Eagle Technology and Esri to explore Esri's Maritime Server (which has successfully been used by NOAA for 5-10 years and more recently by UKHO) for this purpose and a demonstration site with the LINZ ENCs has subsequently been established by Eagle Technology.*

The benefits to the wider maritime community of having LINZ's ENC data available and published online as a service, include access to current authoritative vector hydrographic charting (updated fortnightly), symbolisation with either S-52 or INT1 symbology and the ability to readily query hydrographic features and integrate ENCs with other maritime-related datasets in a much more seamless and versatile way than is possible with Raster Hydrographic Charts.

(it should be noted that the unencrypted un-symbolised ENC source data layers were already individually available through the LINZ Data Service and unencrypted S-57 ENCs could be made available by LINZ to organisations on request – both for non-navigational use)*

Additional Resources

Esri Maritime

- Maritime Server Documentation
- https://enterprise.arcgis.com/en/maritime
- Esri Hydrographic Office
- https://esriho.maps.arcgis.com/home/index.html
- ArcGIS Pro
- https://pro.arcgis.com/en/pro-app/latest/help/production/maritime/get-started-with-maritime-charting.htm

- ArcGIS Pro can natively view S-57 ENC Charts (but not S-63 ENCs directly due to licensing, rather than technical considerations – to prevent the data from being extracted and re-used)
- https://pro.arcgis.com/en/pro-app/latest/help/mapping/layer-properties/enc-layers.htm
- https://pro.arcgis.com/en/pro-app/3.1/help/mapping/layer-properties/work-with-enc-layers.htm

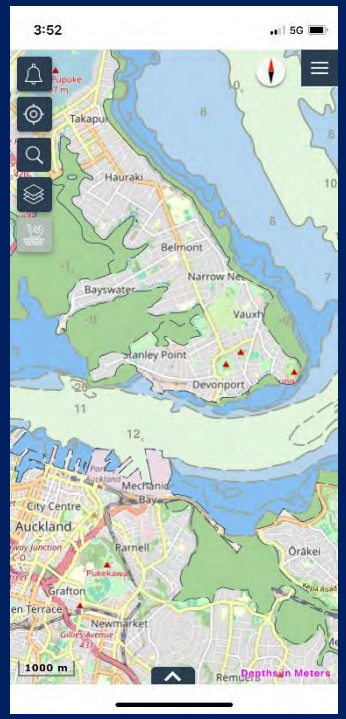
Additional Resources (Cont.)

Free and low-cost S-63 compatible software

- OpenCPN (Free and Open Source) Chart Plotter Navigation software
- https://opencpn.org/index.html
- Requires an S-63 Permit for the system to be purchased to enable their use - 12.50 Euros.
- https://o-charts.org/shop/en/6-s-63

- **SEAiq Recreational (app)** https://seaiq.com/recreational.html
- **SEAiq Pilot (software/app)** https://seaiq.com/ (not low cost)
- **IIC NaAVIC (free app which serves LINZ ENC Data)**

- **GlobalMapper (S-63 compatible, but not S-52/INT1 Symbology enabled)** https://www.bluemarblegeo.com/global-mapper/

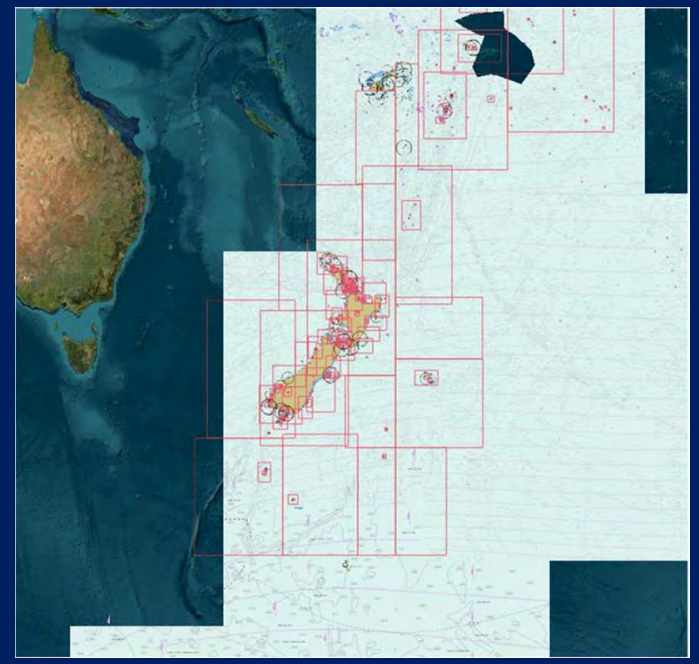


Online Demonstration Links

- **Maritime Chart Server Services with LINZ S63 ENC Service Hydrographic Charts:**
- ArcGIS Custom Chart Builder (WebApp) S-52 Symbology
  https://jfp1091.cloud.eaglegis.co.nz/ccb/
- ArcGIS Custom Chart Builder (WebApp) INT1 Symbology
  https://jfp1091.cloud.eaglegis.co.nz/INT1/
- ArcGIS Map Server Service (S-52 Symbology)
  https://jfp1091.cloud.eaglegis.co.nz/server/rest/services/Nautical/MapServer/exts/MaritimeChartService/MapServer
- ArcGIS WMS Service (S-52 Symbology)
  https://jfp1091.cloud.eaglegis.co.nz/server/rest/services/Nautical/MapServer/exts/MaritimeChartService/WMSServer
- ArcGIS Map Server Service (INT1 Symbology)
  https://jfp1091.cloud.eaglegis.co.nz/server/rest/services/temp/MapServer/exts/MaritimeChartService/MapServer
- ArcGIS Map Server Service (INT1 Symbology)
  https://jfp1091.cloud.eaglegis.co.nz/server/rest/services/temp/MapServer/exts/MaritimeChartService/WMSServer

- Charting and Bathymetry integration
  - Webmap integrating the ENC Service and Bathymetric Survey data:
- https://jfp1091.cloud.eaglegis.co.nz/portal/apps/mapviewer/index.html?webmap=e9ccf847f25744a38ccaf23d4ee64937

ArcGIS Maritime Server Capability Overview

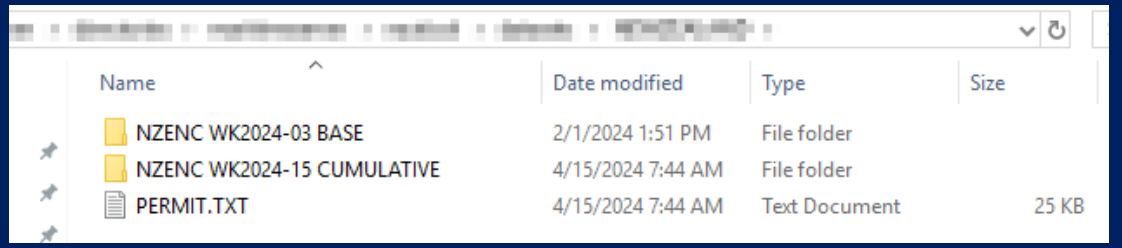


- ArcGIS Server Architecture
- Loading LINZ ENC data and adding chart updates
- Stopping and starting the service
- Publishing standards (REST, WMS, ArcGIS Online)
- S-57, S-63 support (Future S-101, S-102)
- S-52 Symbology and INT1 Paper Chart-like symbology
- WebApps – Custom Chart Builder – creating pdfs from the web
- Integration with other datasets:
  - Imagery, AIS, Maritime Boundaries, Additional Military Areas – e.g. exercise areas
  - Bathymetry Information Systems (e.g. Esri service, LINZ Data Service)
- Consuming Services (ArcGIS Maritime Service & WMS) in ArcGIS Pro
- Combining Services (ArcGIS Maritime Service & WMS) in ArcGIS Online
- Creating MCS Tile Packages for use offline

ArcGIS Maritime Server – ENC Service Setup Overview

- Loading LINZ ENC Data
- Acquire User Permit file from Esri (maritime@esri.com)
- Register with NZENC Service – providing the above user_permit file
- Download ENC Charts – Base + Latest Cumulative Update
- Place ENC Data, Updates, Permit files in appropriate directories
- If autocellupdate is set to false – stop and restart maritime service to see updated charts

- Fortnightly updates – notification via email to download



ENC Updates

- Fortnightly updates
- Including Temporary and Preliminary Notices to Mariners

NZ 36/24 NEW ZEALAND - North Island - East Coast - Tāmaki Strait. ODAS buoy

1. Chart NZ 5324 *[030/23]*

Insert — *ODAS Fl(5)Y.20s2M* — 36°50'.97S., 175°01'.00E.

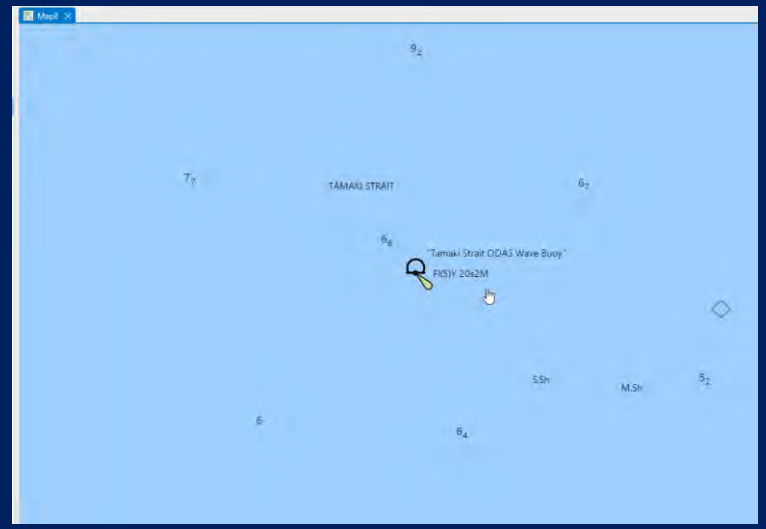
Auckland Council
HITS 5324/128

NZ 65/23 NEW ZEALAND - North Island - East Coast - Tutukaka Harbour. Beacon

1. Chart NZ 5212 (plan, Tutukaka Harbour) *[036/19]*

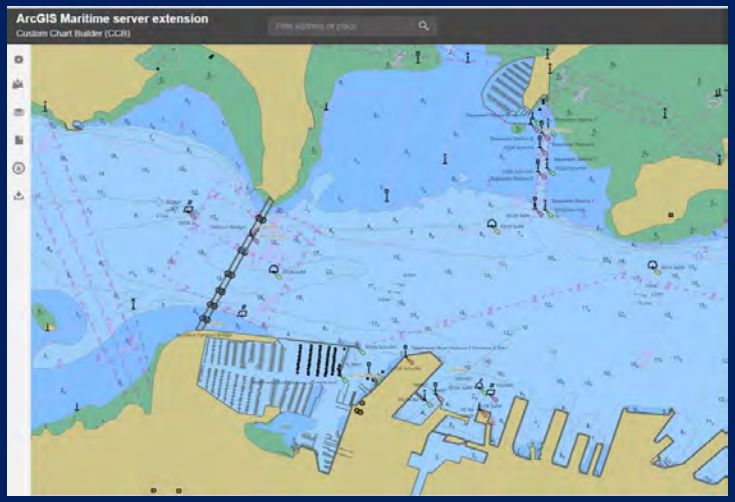
Insert — 35°36'.65S., 174°31'.66E.

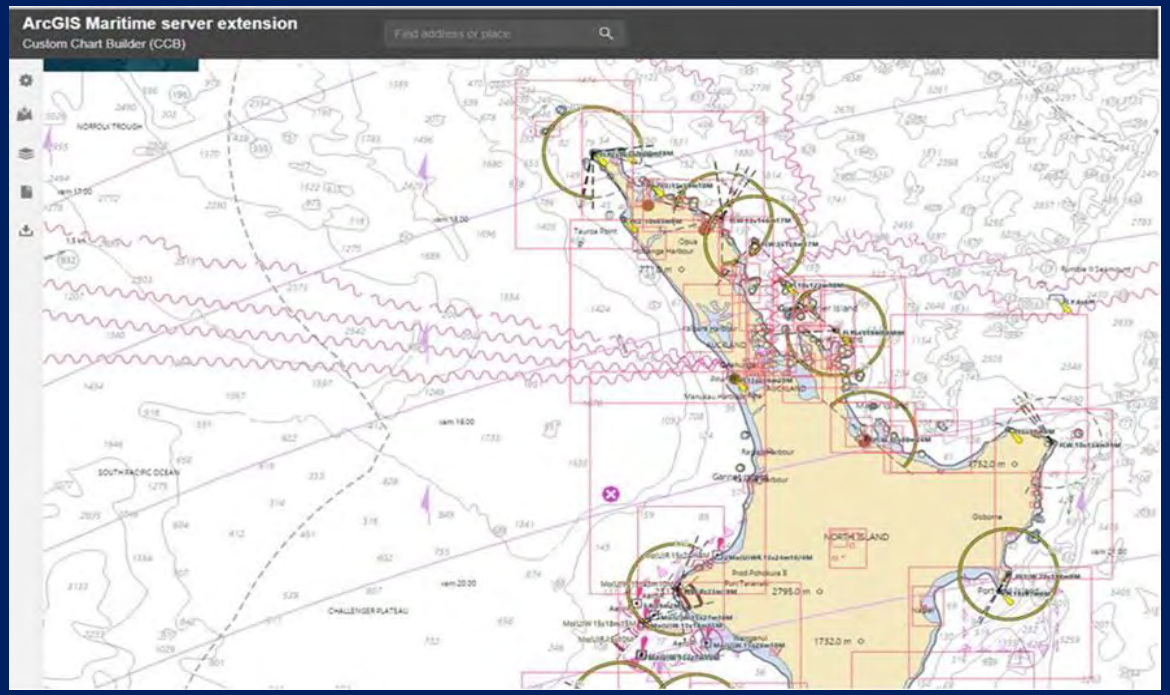
Northland Regional Council
HITS 5212/33



ENC Symbology

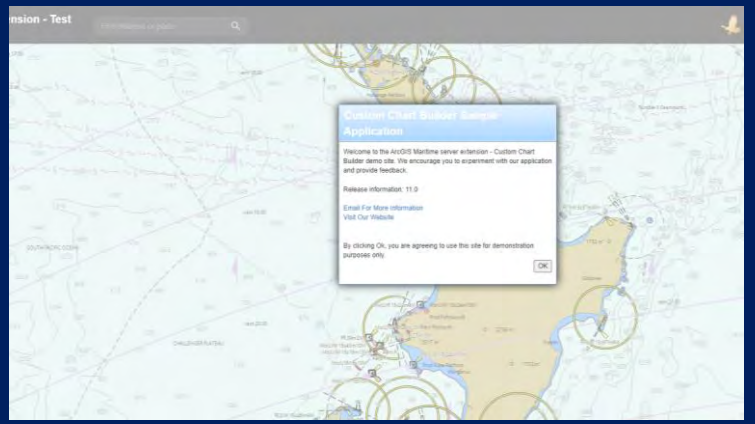
- S-52
- International Hydrographic Organisation Chart 1 (INT1) Paper Chart-like symbology

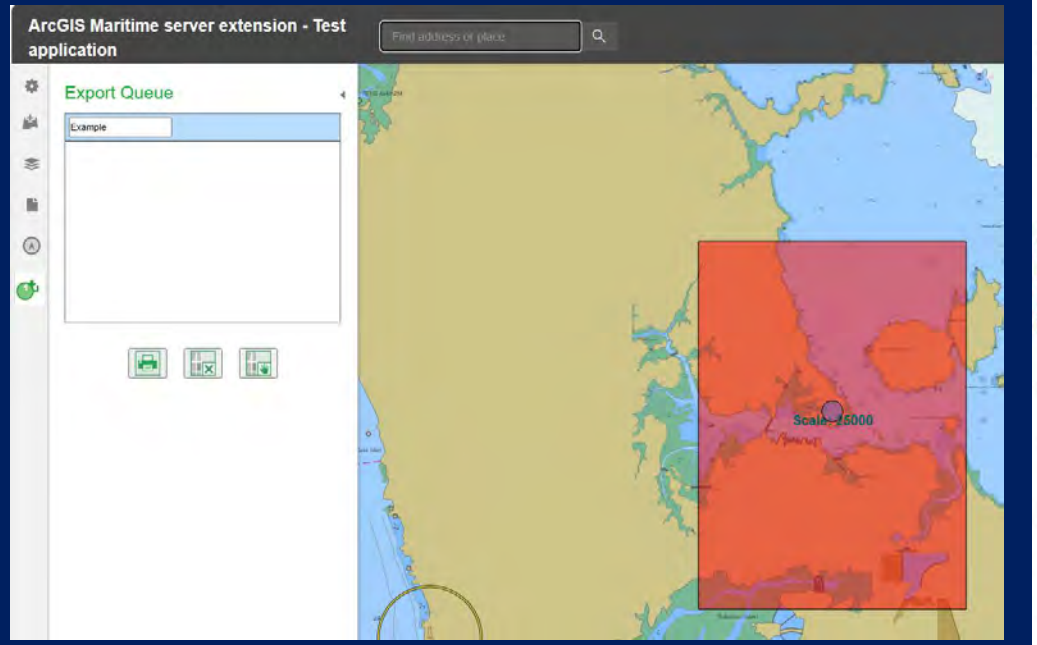


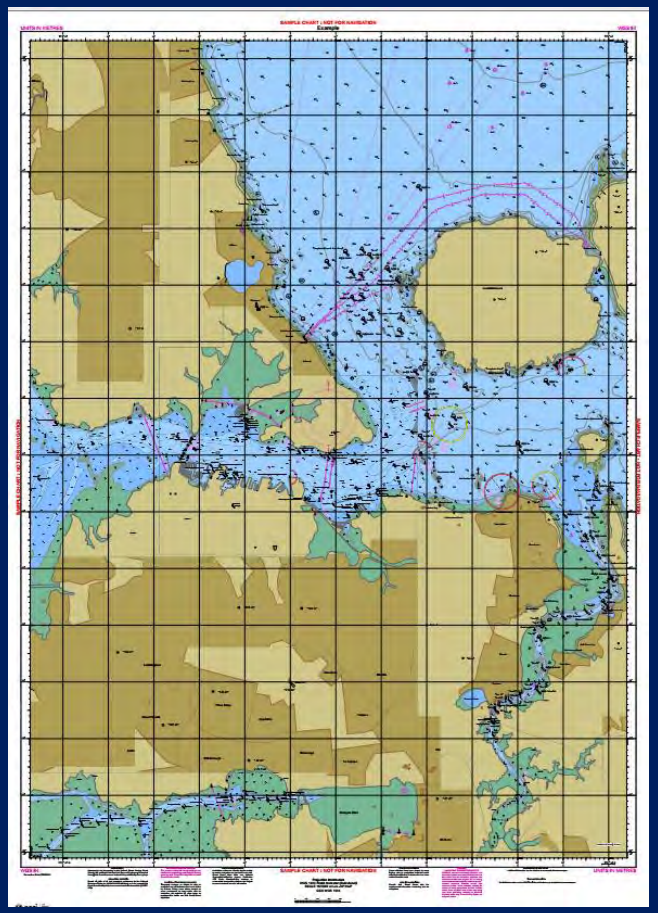


Custom Chart Builder

- View ENC Data
- Add other ArcGIS Services
- Create PDF of Charts

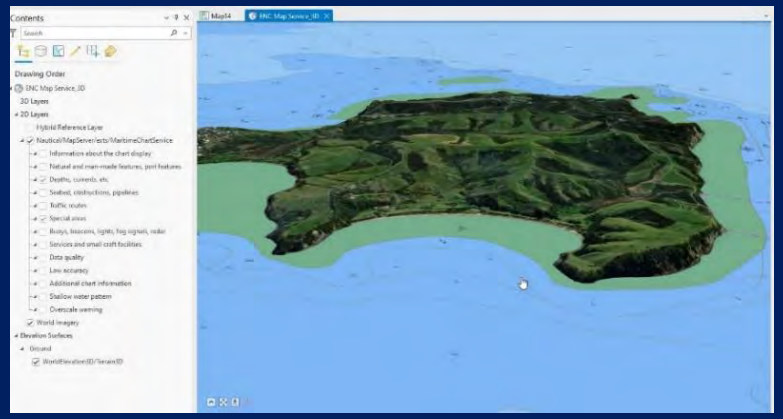


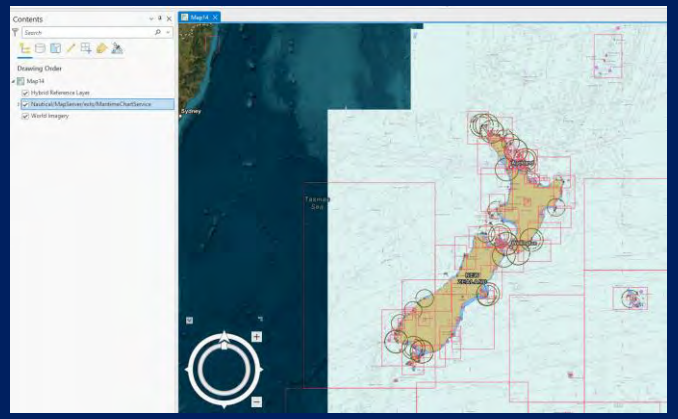


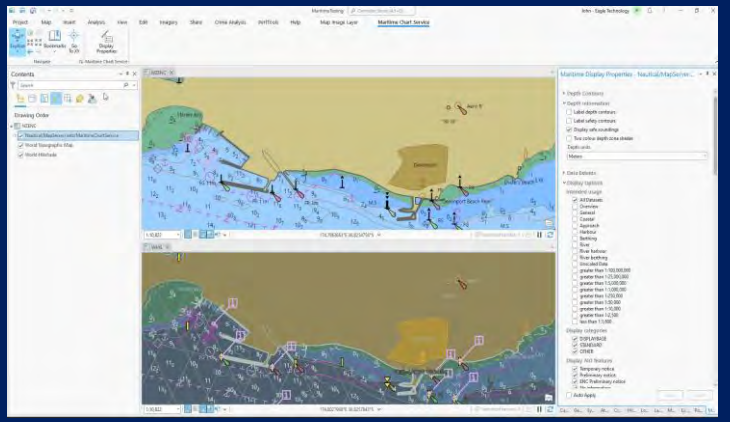


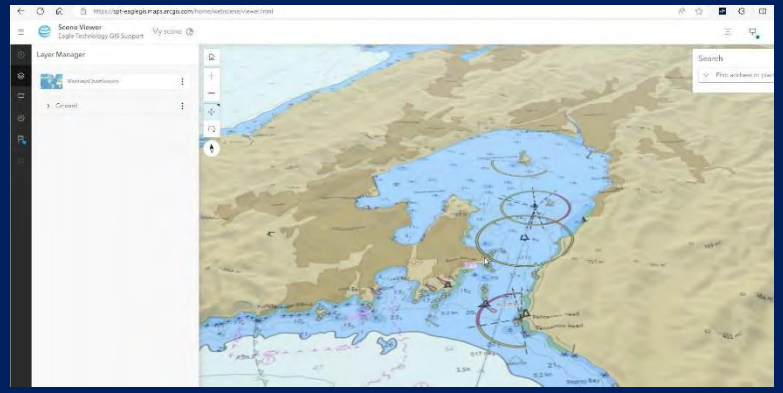
Maritime Chart Server - GIS integration

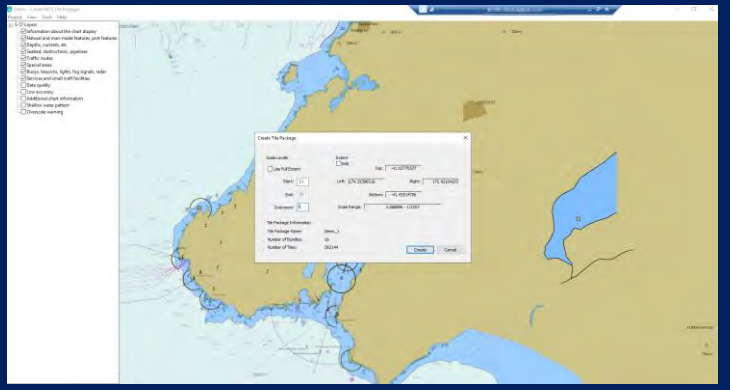
- Adding a Maritime Chart Service into:
  - ArcGIS Pro
  - ArcGIS Pro 3D Scene



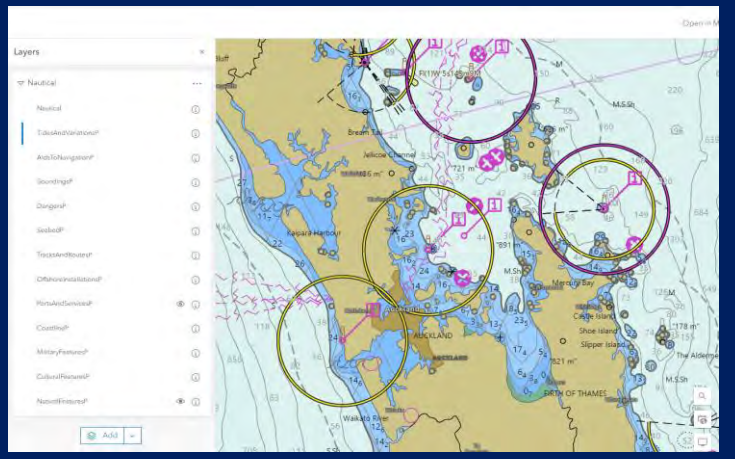






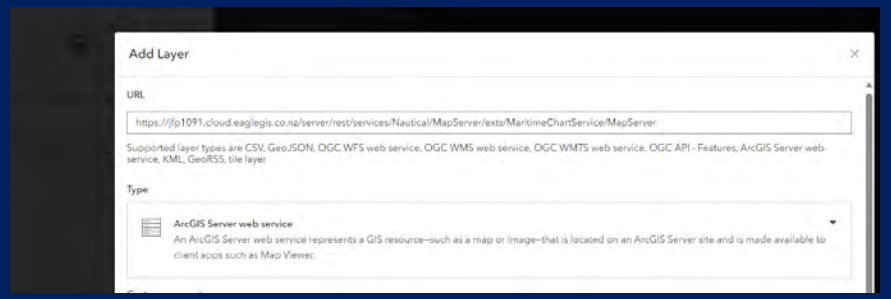


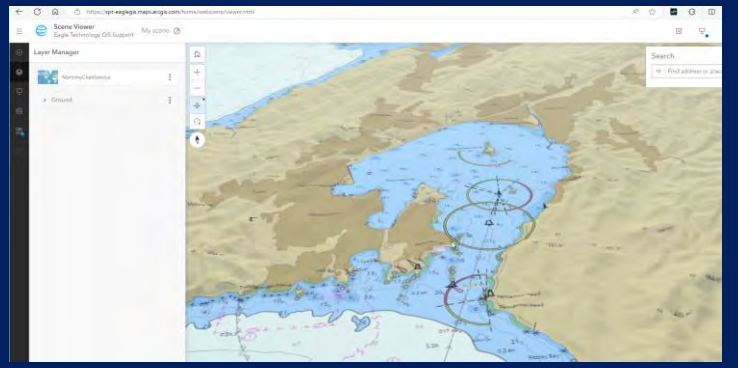
Maritime Chart Server - GIS integration (cont.)



- ArcGIS Online
  - Consume Maritime Service (MapServer or WMS)
  - ArcGIS Online Map Viewer

- Maritime Services (REST/WMS)
- ArcGIS Online 3D Scene Viewer

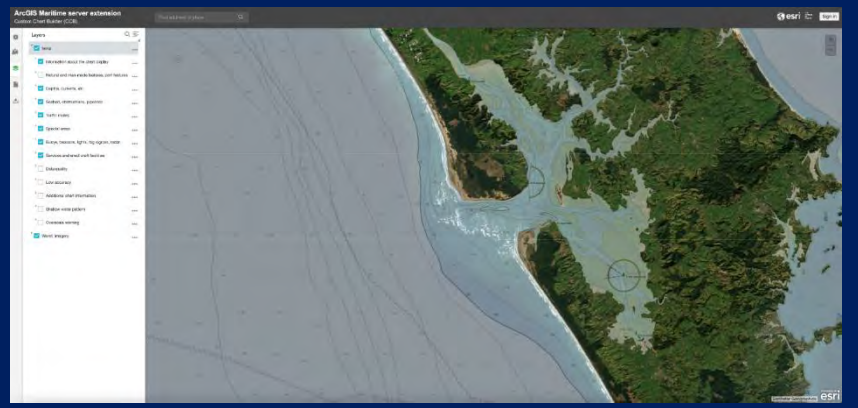




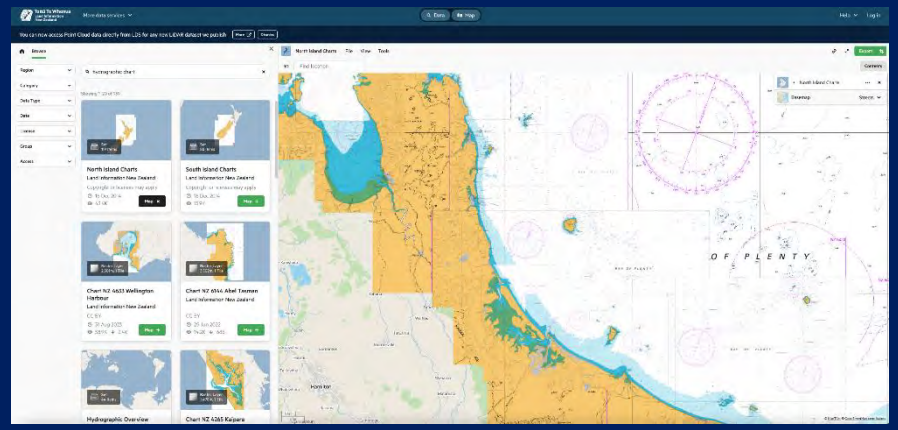
- The Maritime Chart Service Tile Package, or mcstpk.exe, is a stand-alone extension to Maritime Chart Service capabilities, which you can enable for a map service.
- Create a tile package that can be deployed and taken offline
- This design allows you to either leverage existing map services with Maritime Chart Service enabled or create individual Maritime Chart Service projects to manage your tile packages.

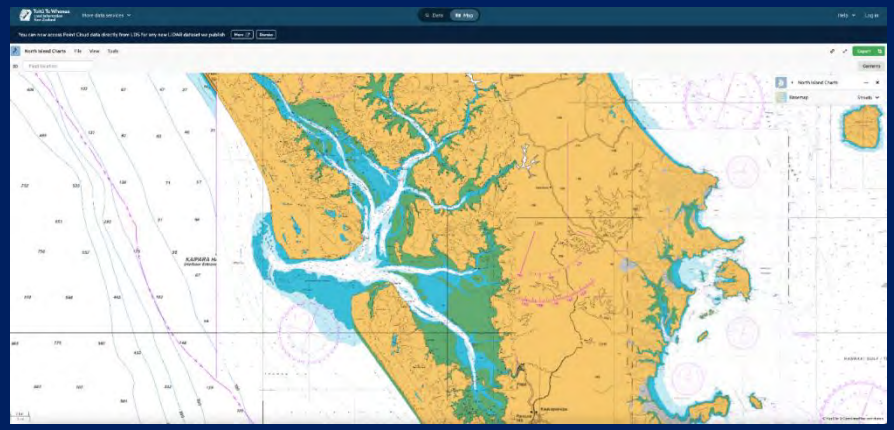
Vector and Raster Comparison

- ENC Vector Chart Service:
  - Layer Control
  - Transparency
  - Integration with other datasets
  - Seamless extent as pan and zoom between chart extents and usage-bands
  - Dynamic Symbology choices (S-52 & INT1)



- Raster comparison
  - NZ Mariner now “Sunsetted”, Geotiffs on LDS have lower update frequency
  - Raster “patchwork” appearance due to irregular chart extents and scales
  - Very little control over appearance of the data
- https://data.linz.govt.nz/data/?q=hydrographic+chart





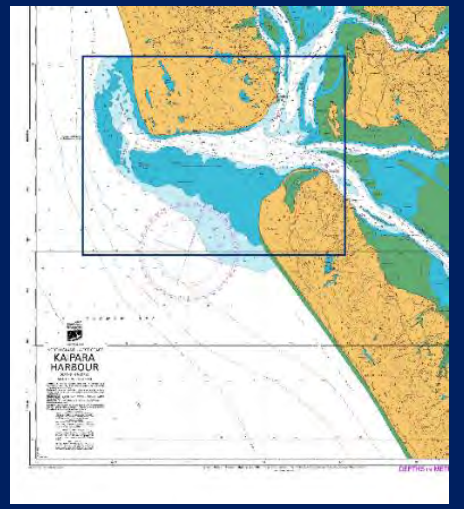


Chart Viewer Generic Features (NOAA)

- The Demonstration of the LINZ ENC Service is similar to (and can be integrated with) NOAA's ENC Chart Viewer which has been available for over 5 years (providing coverage for all of NOAA's Charting Authority Areas, including parts of the SW Pacific):
- https://nauticalcharts.noaa.gov/enconline/enconline.html

- REST service:
- https://gis.charttools.noaa.gov/arcgis/rest/services/MCS/ENCOnline/MapServer/exts/MaritimeChartService

Chart Viewer Generic Features (NOAA)

NOAA ENC Chart Viewer Generic features

- Displays data using S-52 presentation library specification edition 3.4.
- Provides indexing for the S-57 attribute object name
- Provides access to S-57 attribute information
- Links external files to S-57 attributes
- Allows for the best scale data to be displayed similar to how an Electronic Chart Display and Information System displays best scale data based on the map scale as a user zooms in and out of the display

Web application features

- Search service by object name (OBJNAM), national object name (NOBJNM) and dataset names
- Identify features and display their attributes in a pick list
- Zoom to selected features
- Change basemaps
- Measure area and distance, get coordinates
- Set safety, shallow and deep depth contours
- Switch between simplified and traditional symbols
- Display light sectors, safe soundings
- Displays feature symbology based on date dependency range
- Change the background colours of the display
- Turn off certain features or adjust transparency

Session 2

Data Reuse

Lunch break

Session 3 will start at 1.00 pm

Session 3

Data Collection

Megan Melidonis (Greater Wellington Regional Council, Coastal-SIG)

THE NIPPON FOUNDATION-GEBCO SEABED 2030

NZMGI WG

3RD MAY 2024

Crowdsourced Bathymetry in Aotearoa - NZ

Kevin Mackay & Belén Jiménez

1. What is CSB?

2. Around the globe examples

3. CSB Aotearoa – Get involved!

4. Me kōrero - Let's talk

100% mapped by 2030 - How do we do it?

Data IN GEBCO

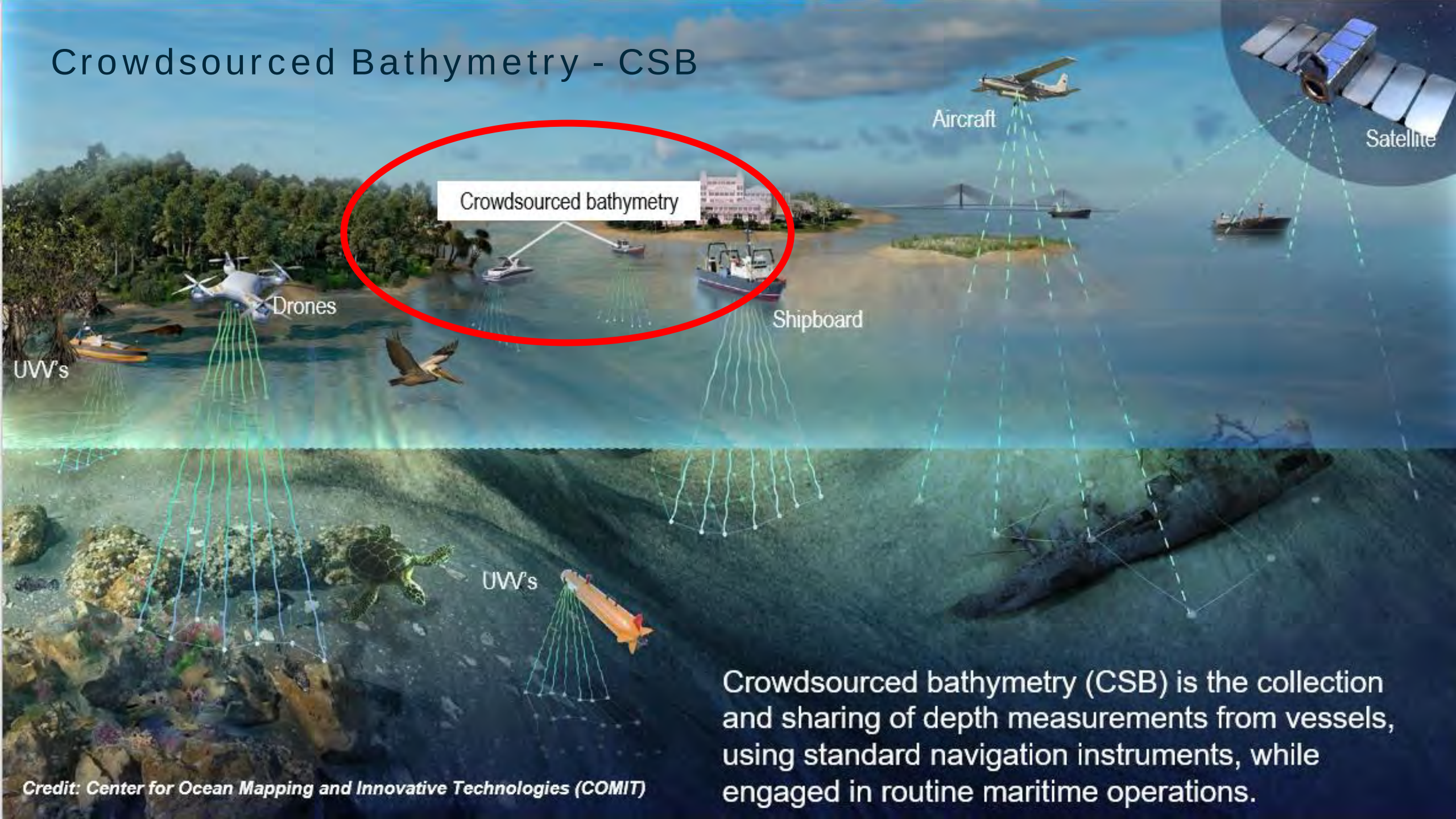
$$A + B + C = 100\%$$

Data NOT in GEBCO

Not Mapped

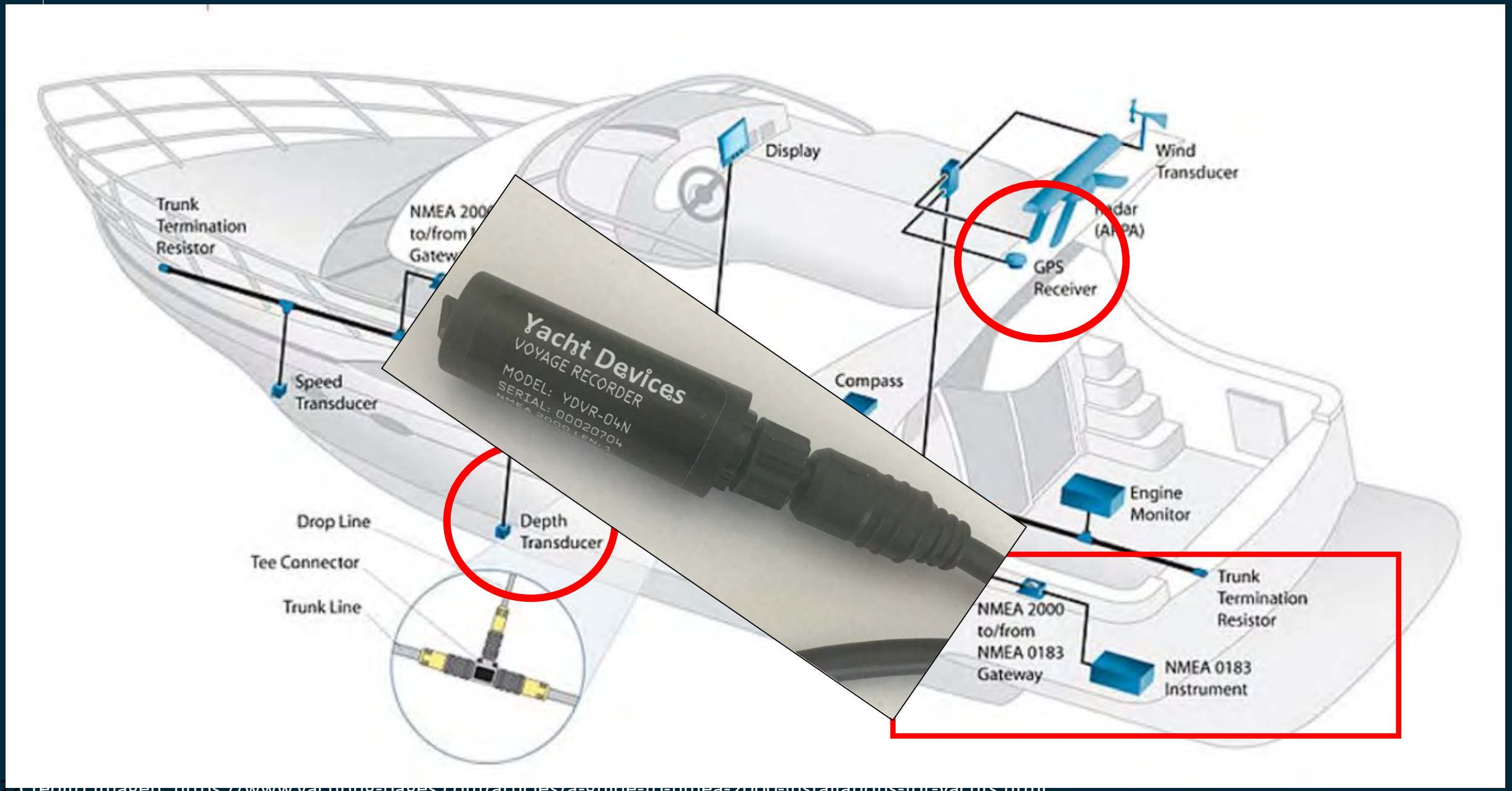
- Data contributions
- Promote Transit Data Collection
- Inform about Gaps & Priorities
- Crowdsourced Bathymetry
- Talk about Seabed2030

Crowdsourced Bathymetry - CSB



Crowdsourced bathymetry (CSB) is the collection and sharing of depth measurements from vessels, using standard navigation instruments, while engaged in routine maritime operations.

Credit: Center for Ocean Mapping and Innovative Technologies (COMIT)



Crédito imagen: https://www.yachting-pages.com/articles/a-guide-to-nmea-2000-installations-for-yachts.html

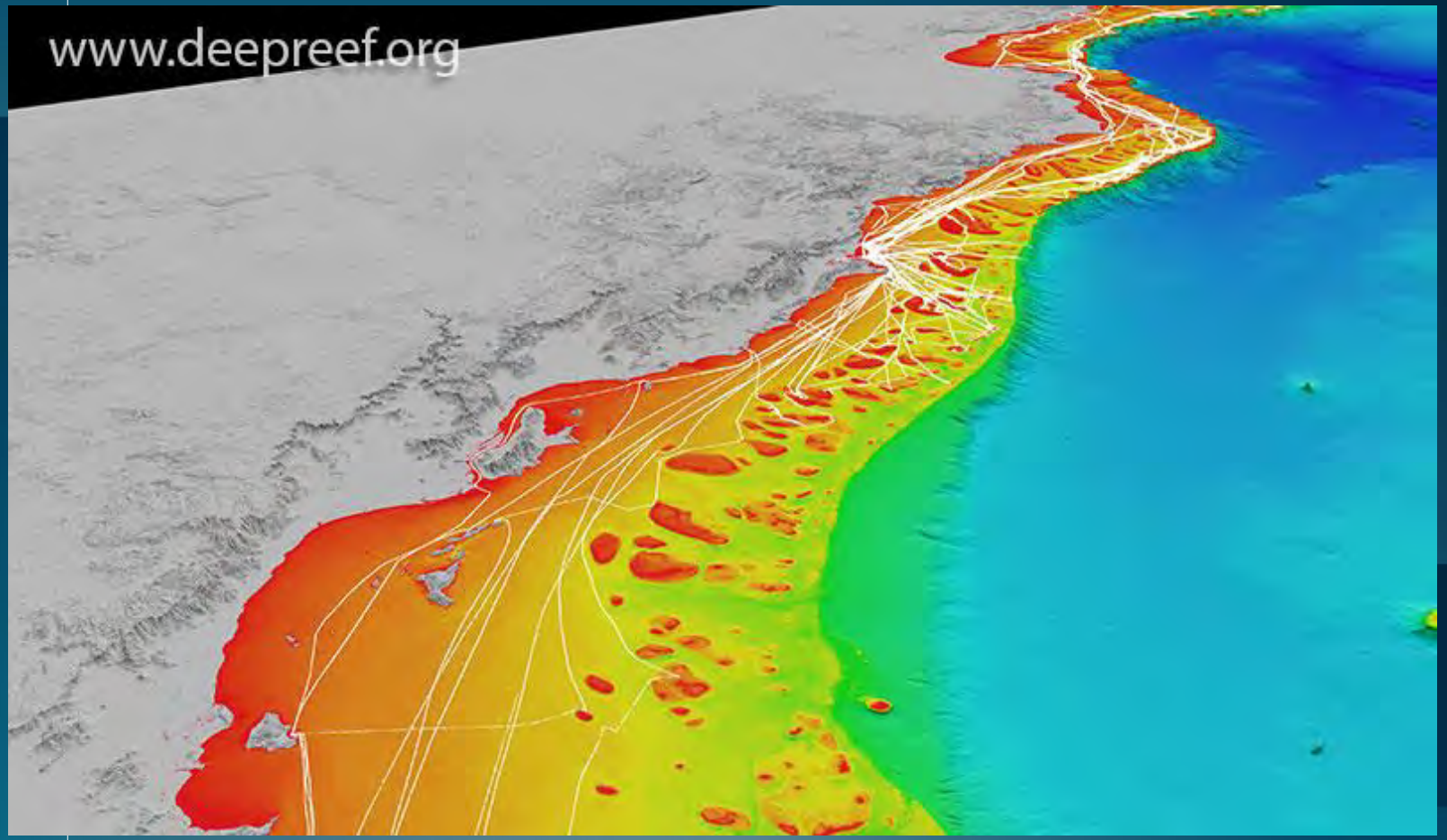
1. What is CSB?

2. Around the globe examples

3. CSB Aotearoa – powered by Seabed2030

4. Me kōrero! - Let's talk!

The Value of CSB Data



- Data with scientific, commercial & research value at little to no cost to the public sector
- Fill gaps where data is scarce (eg: Large Pacific Ocean States)
- Improving safety of navigation
- Supporting priorisation for Mapping Missions

3D view of northern Great Barrier Reef showing all vessel tracks as of December 2019. Credit: Robin Beaman

1. What is CSB?

2. Around the globe examples

3. CSB Aotearoa – Get involved!

4. Me kōrero - Let's talk

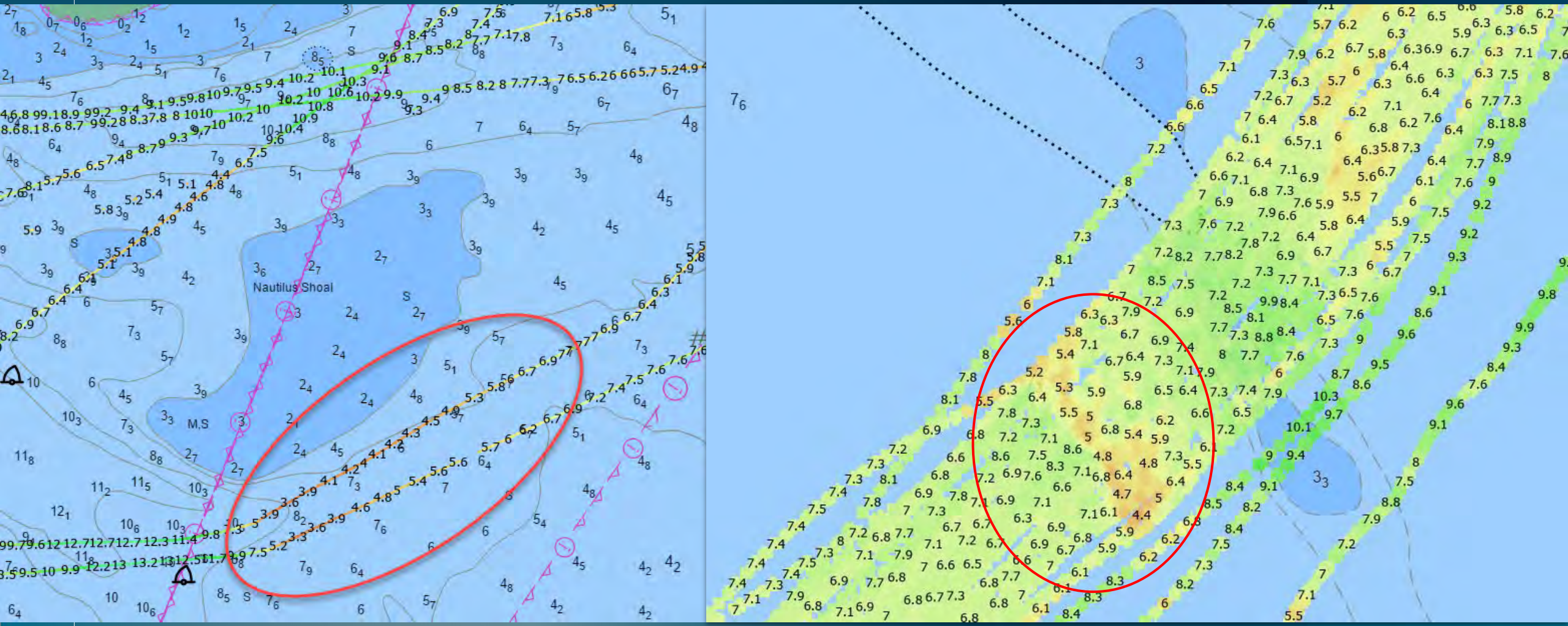
Examples of the value of CSB

Crowd-Sourced Bathymetry in the Northern Canada Area

- Training to Northern communities to gather data & processing techniques

- Fisheries and Oceans Canada provided $453,410 to the Interdisciplinary Centre for the Development of Ocean Mapping (CIDCO) to advance charting of remote areas of Canada.

Examples of the value of CSB



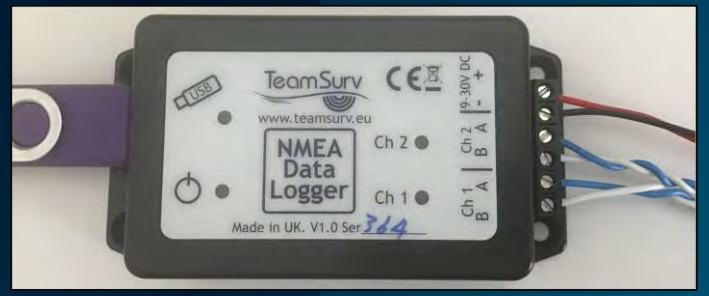
Credit: Anthony Klemm, NOAA

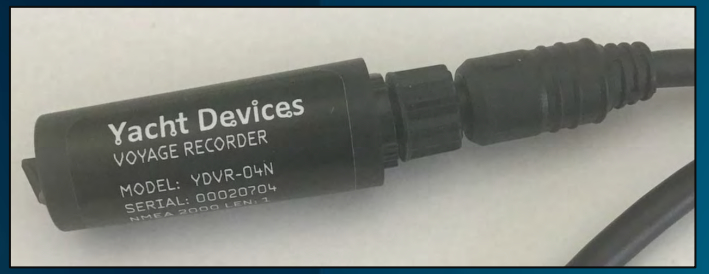
Data Loggers provided by Seabed 2030

Free data loggers provided to the community

Installation support

Assistance with data download and delivery to Seabed 2030 & IHO-DCDB





1. What is CSB?

2. Around the globe examples

3. CSB Aotearoa – Get involved!

4. Me kōrero - Let's talk

Recent examples

Mission

The International SeaKeepers Society promotes oceanographic research, conservation, and education through direct involvement with the yachting community. Providing educational resources and hands-on marine science experiences to students is the primary focus for ensuring the future wellbeing of our planet. SeaKeepers enables the yachting community to take full advantage of their unique potential to advance marine sciences and raise awareness about global ocean issues.

Do you want to get involved in CSB?

Would you like to help realize the CSB Aotearoa vision?
Proposal to organize a CSB Aotearoa Workshop

Do you know of any national/international vessels with survey capability passing by Aotearoa-NZ?

Me kōrero!

Let's talk!

pacific@seabed2030.org

Upcoming events

Seabed 2030 Pacific Ocean Mapping Meeting
Nadi, Fiji
4-6 November 2024

Registration Open!

https://arcg.is/0aiOmy

Read more about the meeting here

IHO – CSBWG16
Wellington, NZ
≈24-27 March 2025

Read more about the Working Group here

NZ Setting international example

Transiting vessels – New Zealand's EEZ

- Now easier to collect **bathymetric data** during **transit** in **NZ's EEZ**
- Marine science research application **not required**
- Toitū Te Whenua Land Information New Zealand authorised to request vessels to activate their seafloor mapping systems during transit
- Submit data to NZ for inclusion in **GEBCO grid**
- If your vessel undertakes transits of NZ's EEZ please contact MSR-NZ@linz.govt.nz for further information and a request to collect bathy data

Bluff Harbour, Southland Region.

Toitū Te Whenua Land Information New Zealand

Te Kāwanatanga o Aotearoa New Zealand Government

Toitū Te Whenua Land Information New Zealand

Wellington Office
Radio New Zealand House
155 The Terrace
PO Box 5501
Wellington 6145
New Zealand
T 0800 665 463
E MSR-NZ@linz.govt.nz
W www.linz.govt.nz

6 December 2022

Dear

Request to collect bathymetric data whilst transiting New Zealand's EEZ

Toitū Te Whenua Land Information New Zealand (LINZ) understands that the **<ENTER VESSEL NAME>** may, from time to time, undertake voyages that include **transits of New Zealand's Exclusive Economic Zone**.

LINZ has been authorised by NZ's Ministry of Foreign Affairs and Trade (MFAT) to request vessels to:

- activate their seafloor mapping systems whilst transiting NZ's EEZ, and
- subsequently transmit the data to LINZ.

MFAT has confirmed that a **marine science research (MSR) application is not required** for such activities undertaken at LINZ's request, whilst noting that this waiver does not give away any of New Zealand's existing rights in relation to MSR under UNCLOS.

Data received will be used for the sole purpose of increasing the coverage of the GEBCO grid within NZ's EEZ; the data will not be used for navigation purposes.

LINZ affirms that any data collected on a 'best endeavours' basis will be accepted and treated accordingly, and that the supplying agency will not be held liable for any consequences arising from the the quality of such data.

In the first instance I ask that you contact our MSR Coordinator at MSR-NZ@linz.govt.nz to assist us to understand your schedule, and facilitate delivery of the transit data to LINZ.

Please also note that this request is not voyage-specific; it applies to any expeditions undertaken by the above-named vessel during transits of NZ's EEZ.

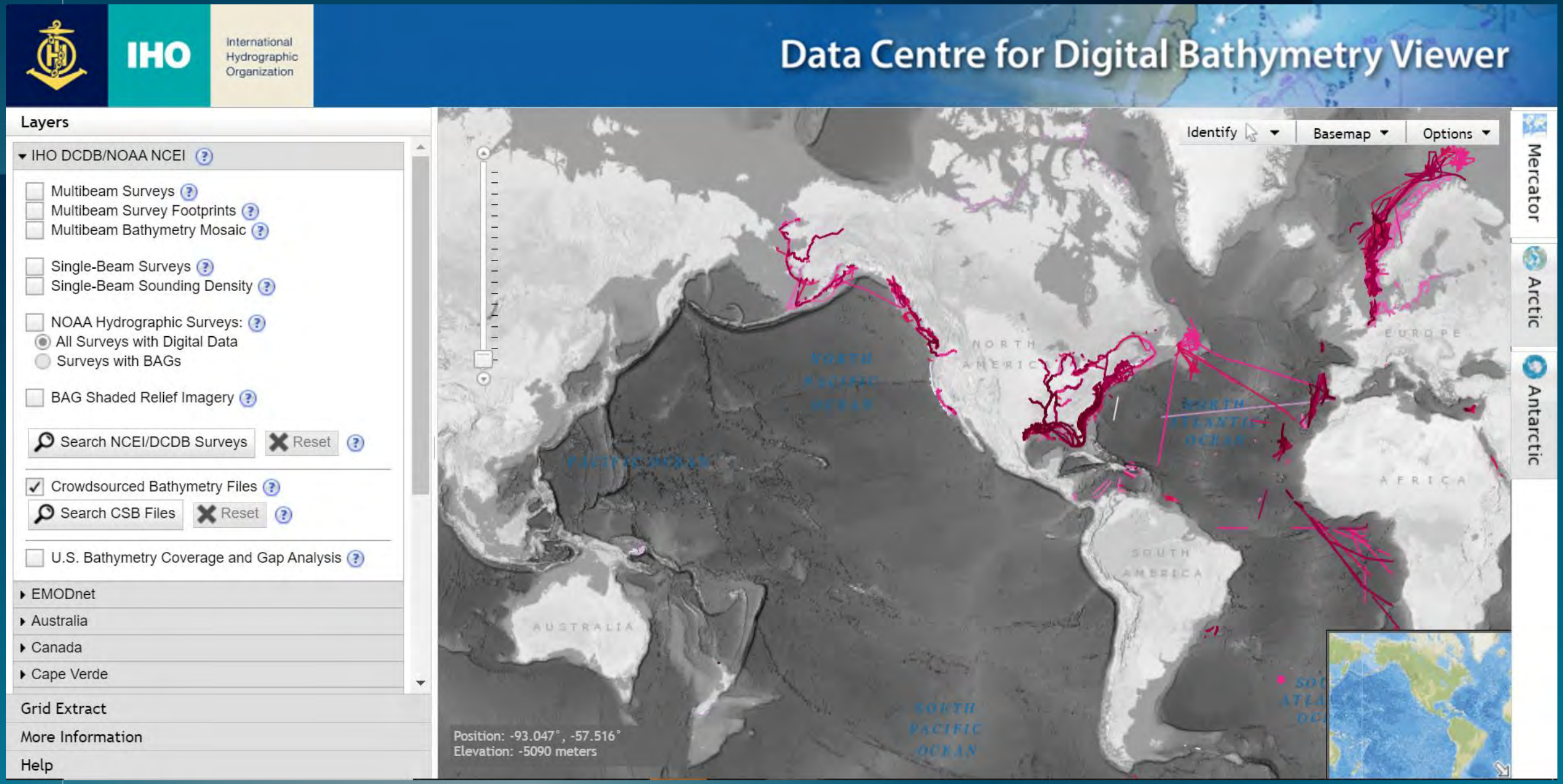
We look forward to receiving your co-operation to enhance our understanding of the nature of the seafloor within NZ's EEZ.

Yours sincerely

Adam Greenland, National Hydrographer

Publicly available CSB Data

https://www.ncei.noaa.gov/maps/iho_dcdb/



Publicly available CSB Data

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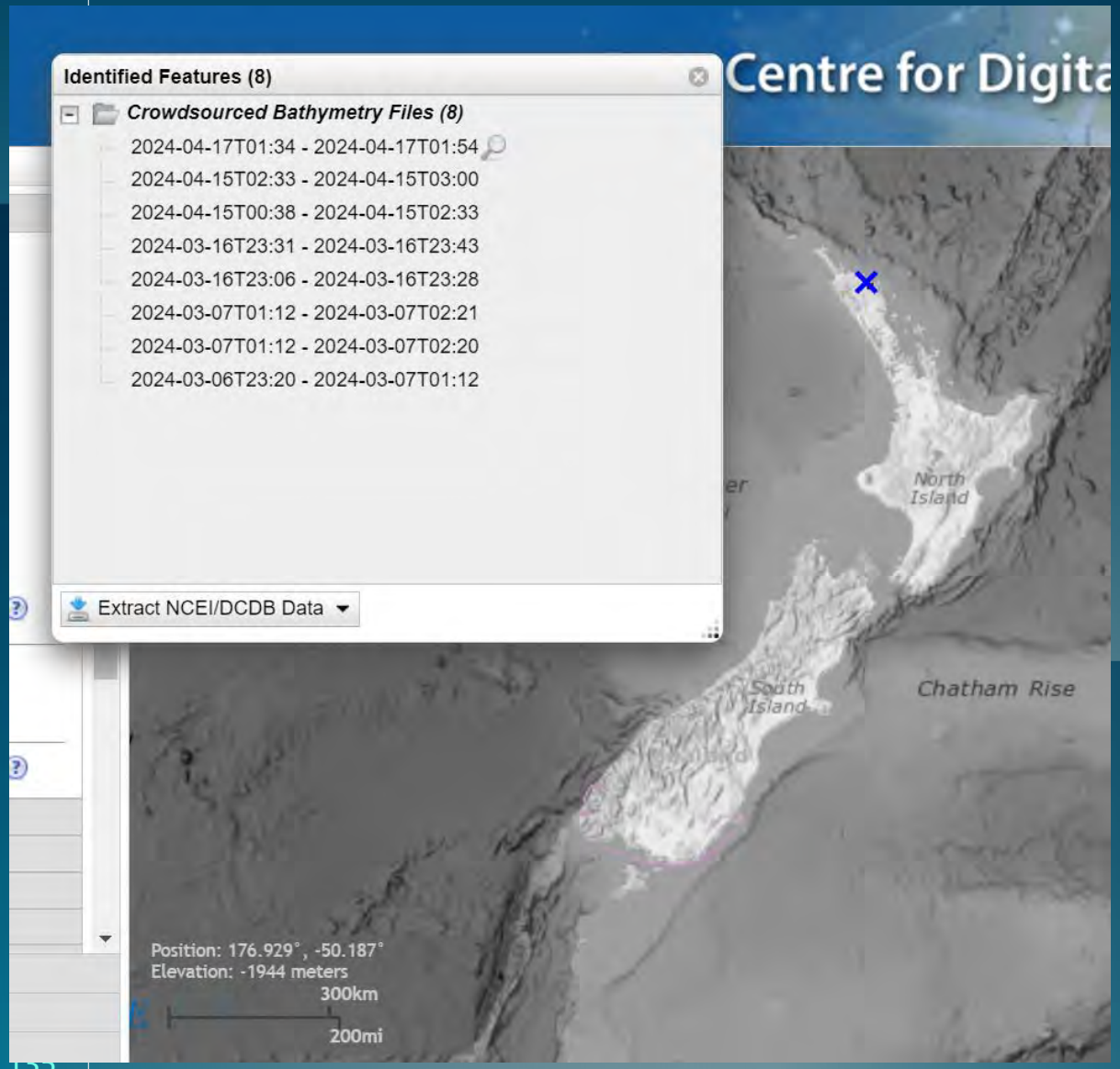
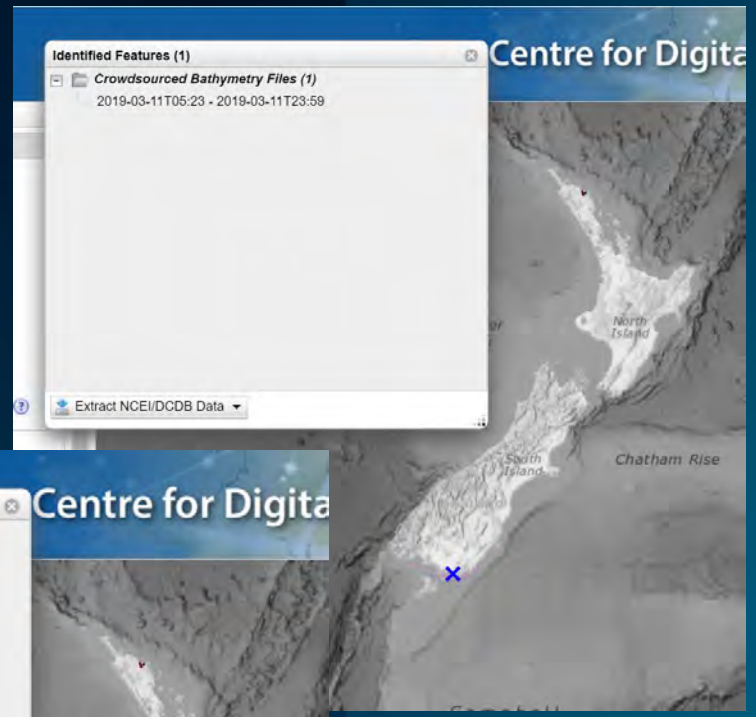
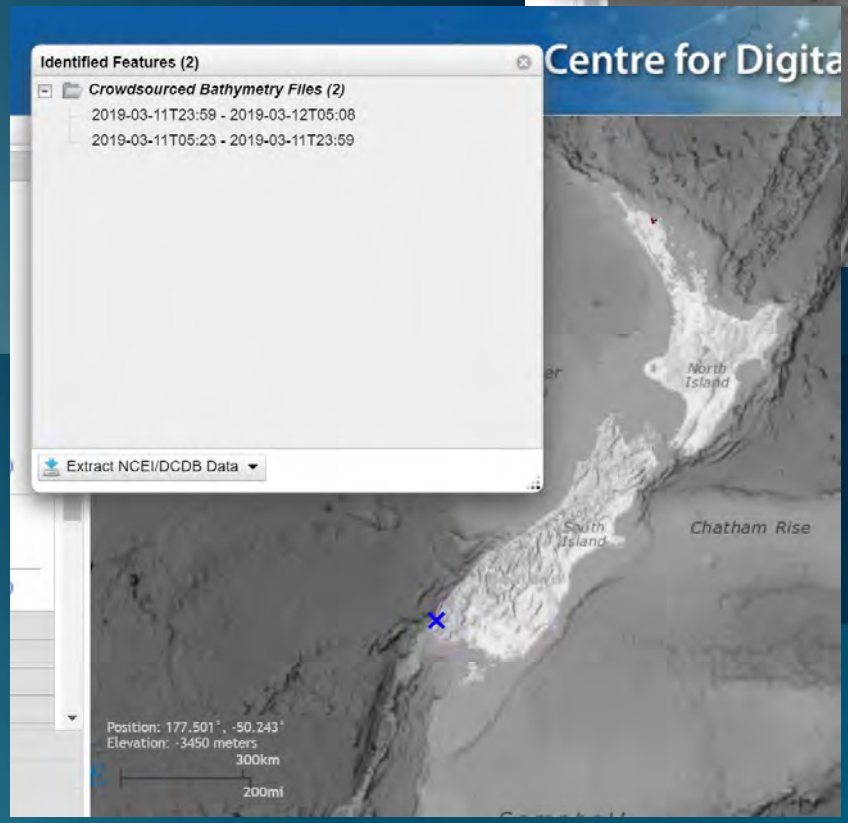
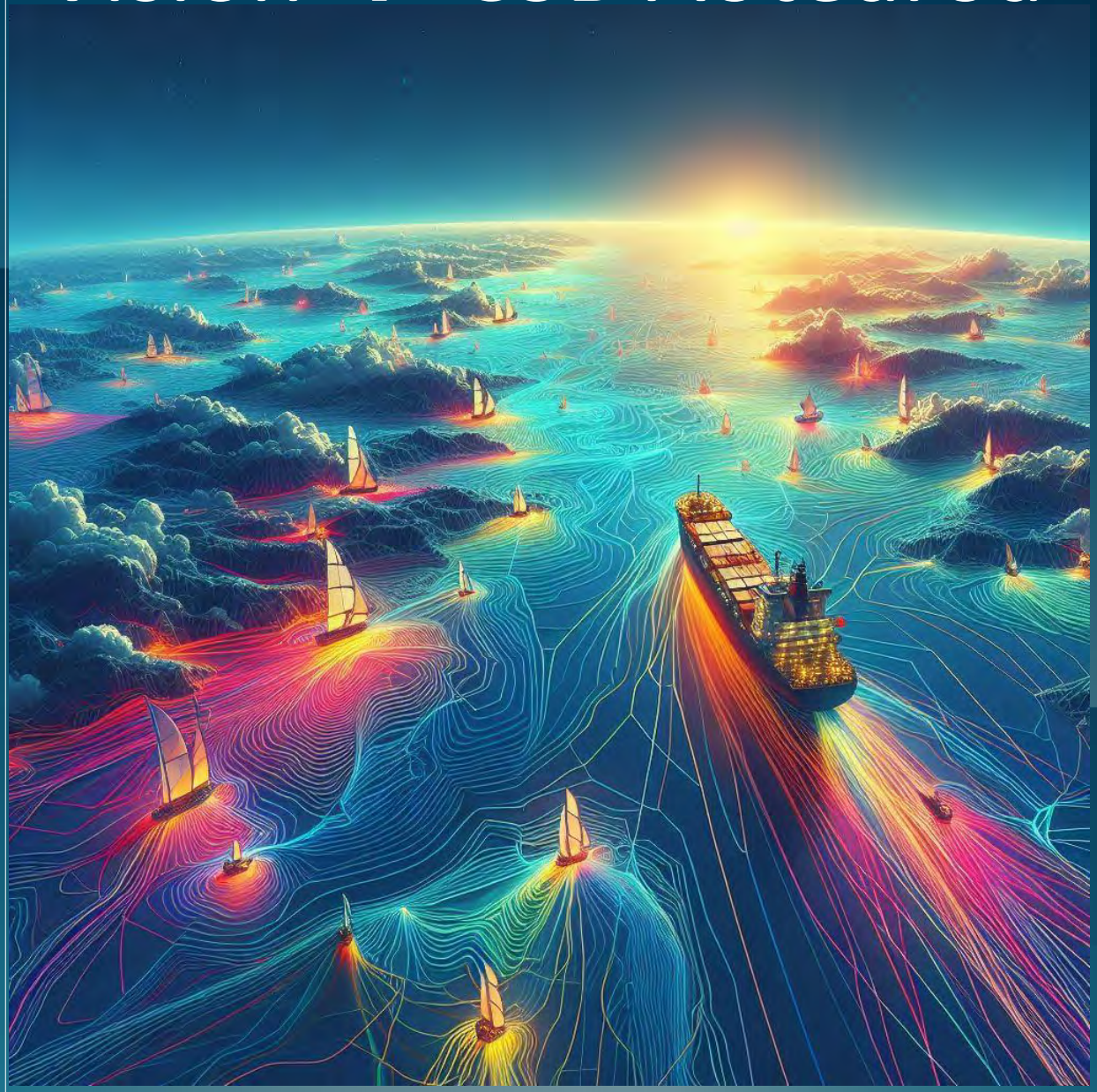


11 data files in Aotearoa





Vision → CSB Aotearoa



Credit: Liva Goba, AI Disigned

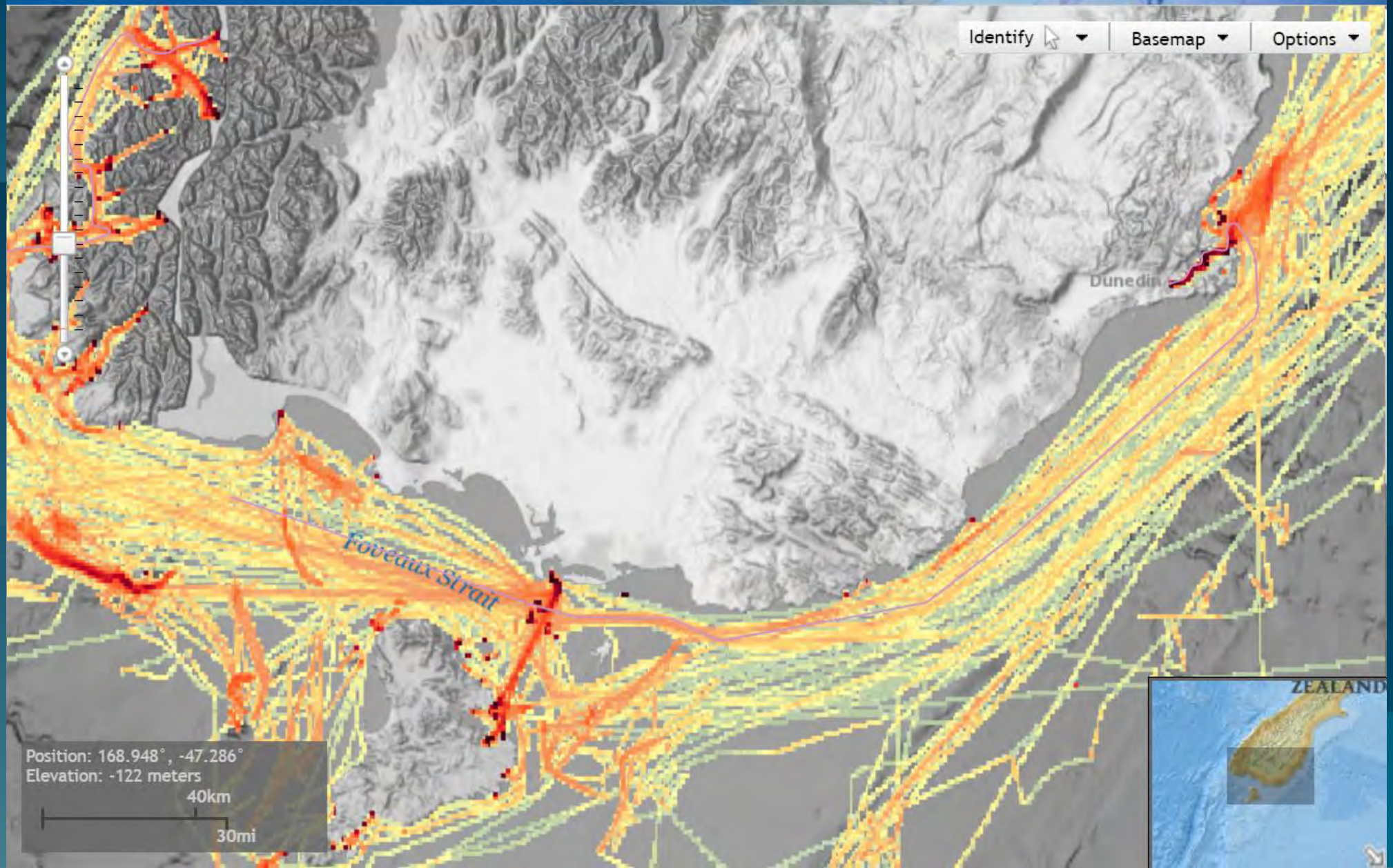
Benefits of a larger Crowd

- Better coverege/density
- More overlap with well mapped areas
- More overlap between tracks
- Higher chances to reach romote areas

Recent examples

SEABED 2030

Data Centre for Digital Bathymetry Viewer



Recent examples

JOIN OUR MISSION

www.seabed2030.org

seabed2030.org/get_involved

E-mail us at:

pacific@seabed2030.org

Toitū Te Whenua
Land Information
New Zealand

Coordinated Seafloor Mapping - Opportunities for broader outcomes

MGI 24

Stuart Caie
Mātanga Tātai Wāhi Mātāmua / Principal Geospatial Specialist
New Zealand Hydrographic Authority

3 May 2024

New Zealand Hydrographic Authority

Toitū Te Whenua
Land Information New Zealand

Te Kāwanatanga o Aotearoa
New Zealand Government

Conventions

List of Conventions

Status of Conventions

Action Dates

International Convention for the Safety of Life at Sea (SOLAS), 1974

Home ⟶ About IMO ⟶ Conventions ⟶ International Convention for the Safety of Life at Sea (SOLAS), 1974

Adoption: 1 November 1974; Entry into force: 25 May 1980

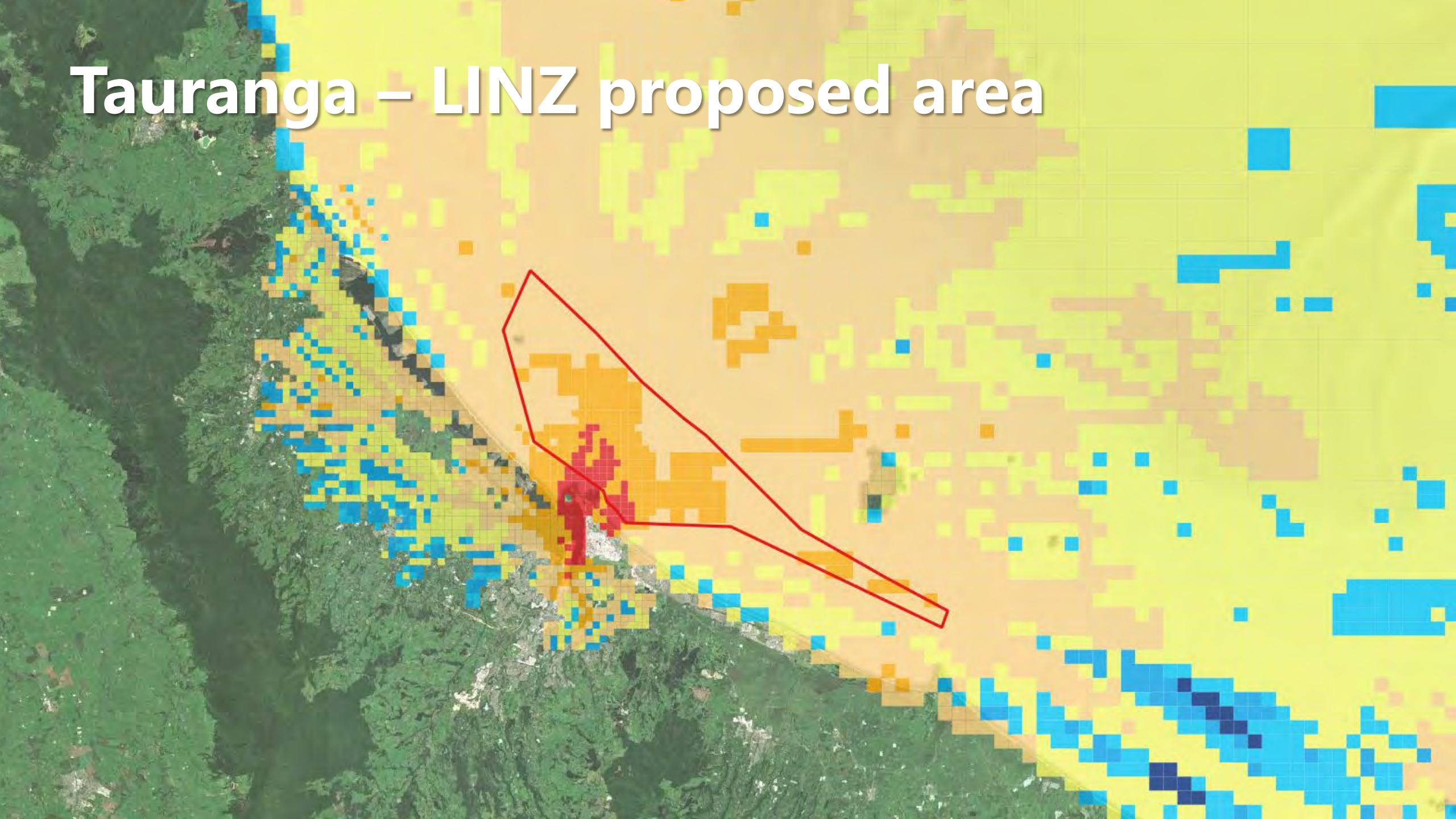
The SOLAS Convention in its successive forms is generally regarded as the most important of all international treaties concerning the safety of merchant ships. The first version was adopted in 1914, in response to the Titanic disaster, the second in 1929, the third in 1948, and the fourth in 1960. The 1974 version includes the tacit acceptance procedure - which provides that an amendment shall enter into force on a specified date unless, before that date, objections to the amendment are received from an agreed number of Parties.

As a result the 1974 Convention has been updated and amended on numerous occasions. The Convention in force today is sometimes referred to as SOLAS, 1974, as amended.

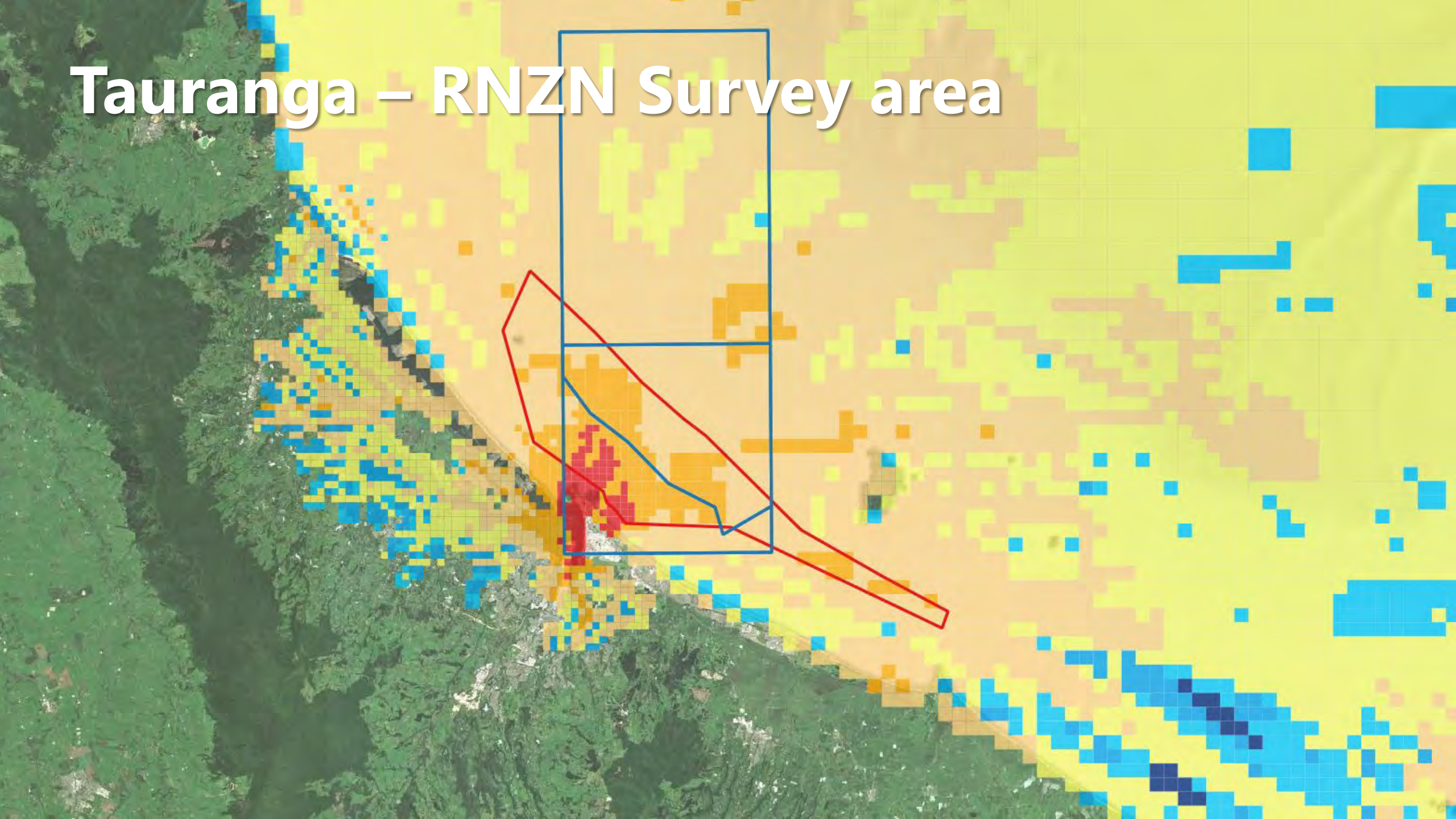
HYPLAN

Approaches to Tauranga
Kawhia
Approaches to Whanganui
Abel Tasman
Western Marlborough Sounds
Port Underwood
Approaches to Westport
Approaches to Greymouth
Approaches to Otago Harbour

Tauranga – LINZ proposed area



Tauranga – RNZN Survey area



Department of Conservation
Te Papa Atawhai

Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

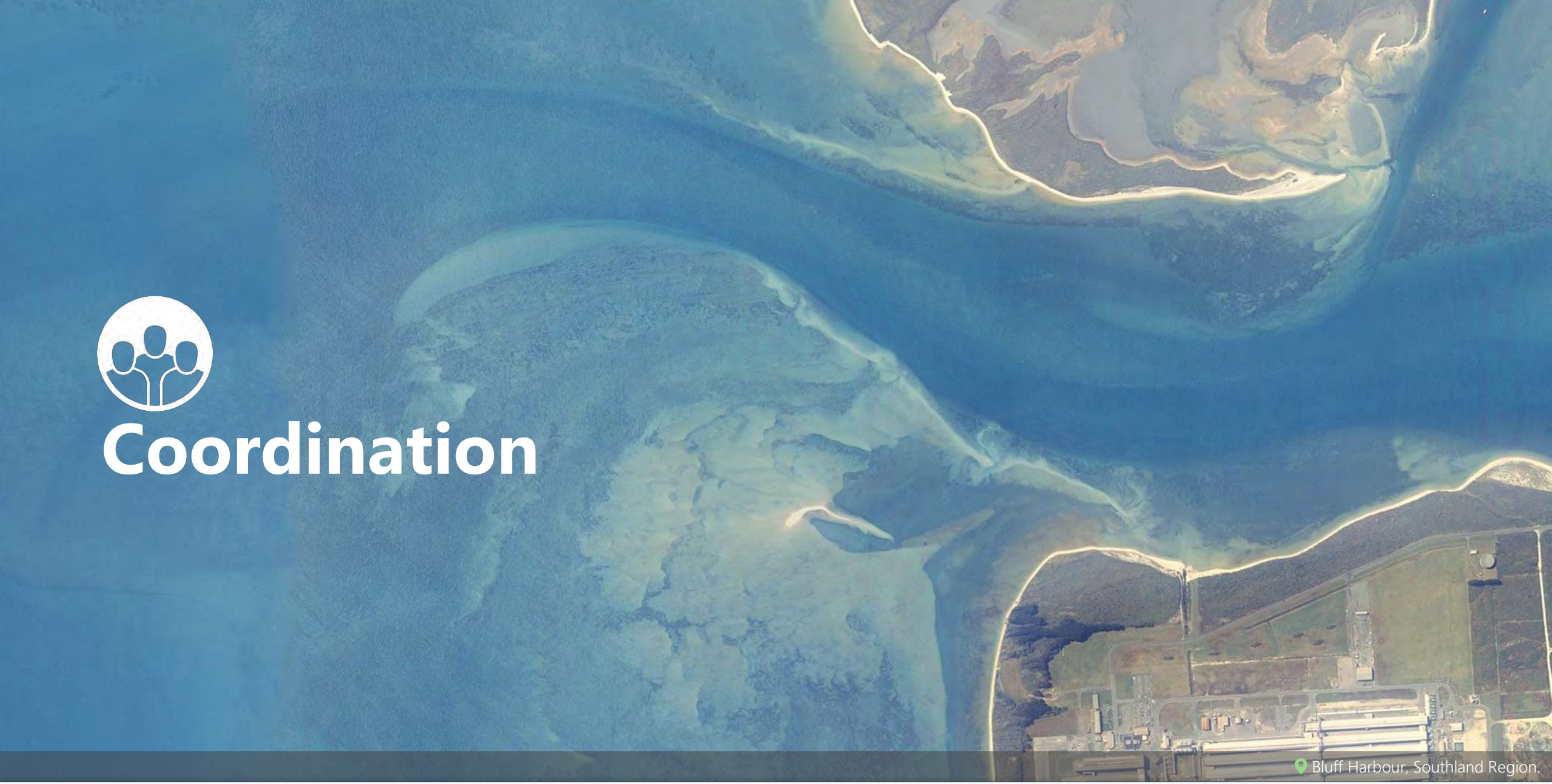
Ministry for Primary Industries
Manatū Ahu Matua

Nelson City Council
Te Kaunihera o Whakatū

MARLBOROUGH DISTRICT COUNCIL

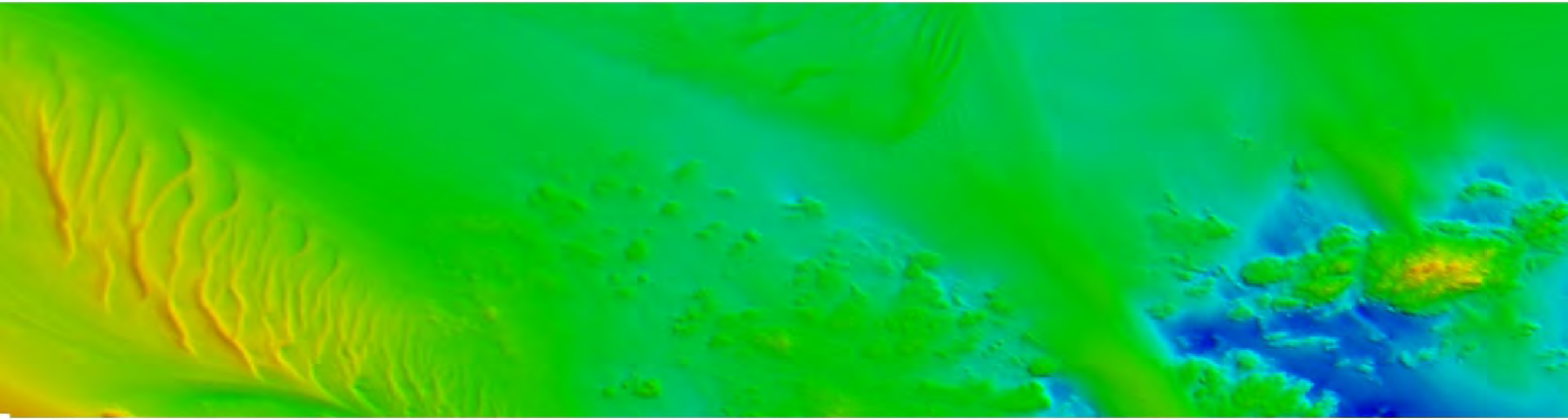
NGĀI TAHU SEAFOOD

Coordination



Bluff Harbour, Southland Region.

https://storymaps.arcgis.com/stories/60af74f682bb40ed946a3c60d5cfa973



Mapping Aotearoa's Seafloor

A visual demonstration of Toitū Te Whenua LINZ's seafloor mapping programme

Where would you like data collected?*

- (●) I have a shapefile of my area(s)
- ( ) I want to draw my area on a map

Area of interest - upload a shapefile

Drag and drop your shapefile (zip) of the area(s).

Drop file here or select file (zip)

Datasets of interest

For typical LINZ seafloor mapping surveys, the following datasets are collected:

- bathymetry (depths)
- seafloor backscatter
- water column backscatter
- sound velocity profiles
- seafloor samples

Tell us of any other datasets you may be interested in below.

1000

Where would you like data collected?*

- ( ) I have a shapefile of my area(s)
- (●) I want to draw my area on a map

Area of interest - draw on the map below

Zoom in and draw a polygon of your area using the polygon button to the right of the map.

To finish drawing, either click the check mark or double click on the last point.

No geometry captured yet.

Ngā mihi nui

Toitū Te Whenua
Land Information
New Zealand

Mapping the Gap

An update on LINZ's 3D Coastal Mapping Project

Brad Cooper
Mātanga Tātai Wāhi Matua / Senior Geospatial Specialist

11-April-2024

Toitū Te Whenua
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New Zealand

Mapping the Gap

An update on LINZ's 3D Coastal Mapping Project

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Mātanga Tātai Wāhi Matua / Senior Geospatial Specialist

11-April-2024

Mapping NZ 2025

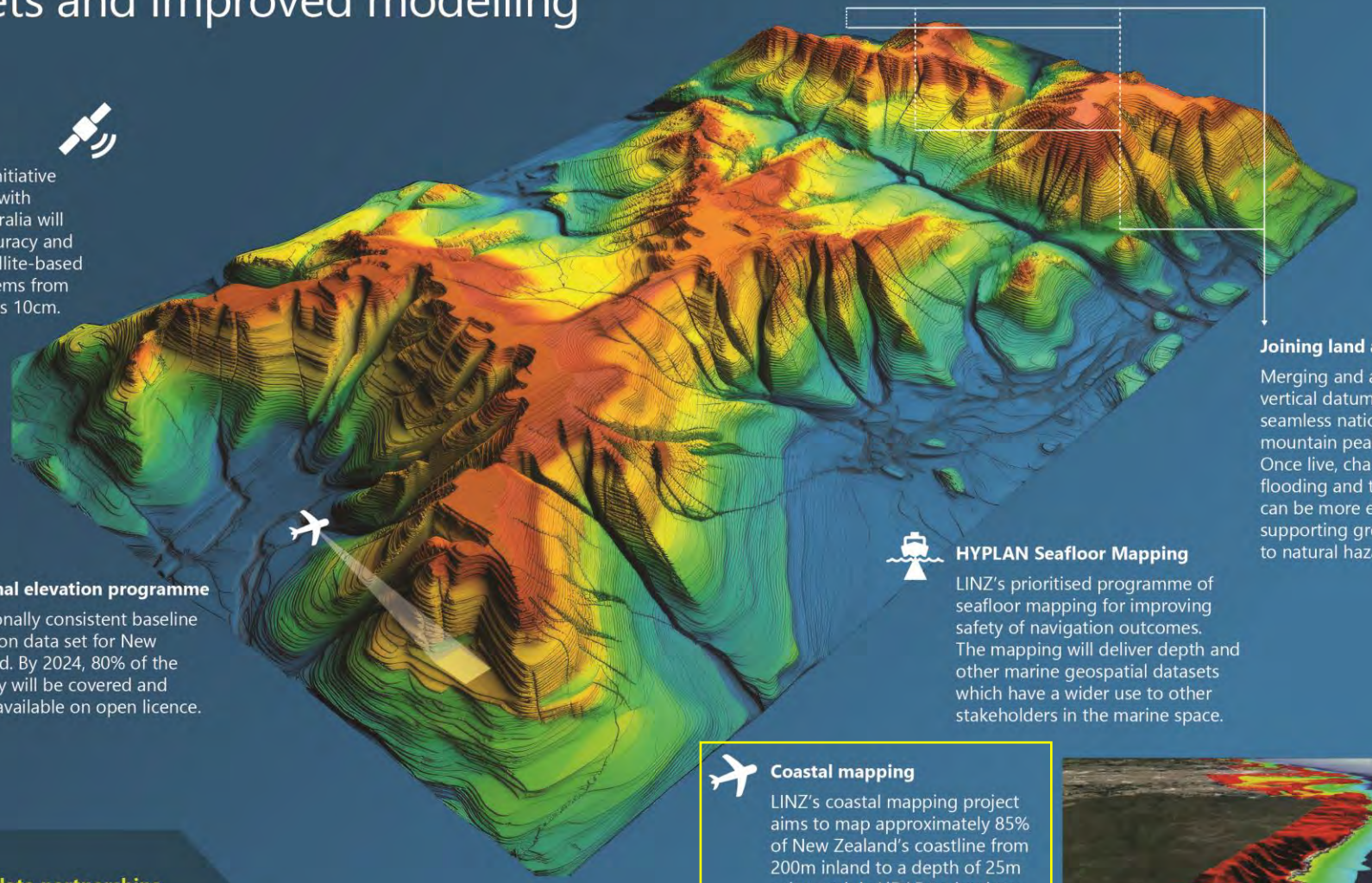
Our vision

Seamless mapping across the land and seabed for integrated datasets and improved modelling

Toitū Te Whenua
Land Information
New Zealand

SouthPAN

Our SouthPAN initiative in collaboration with Geoscience Australia will improve the accuracy and reliability of satellite-based positioning systems from 10m to as little as 10cm.



Joining land and sea project

Merging and aligning multiple vertical datums to enable a seamless national map from mountain peak to seabed. Once live, changes in sea levels, flooding and tsunami inundation can be more easily modelled, supporting greater resilience to natural hazards.

National elevation programme

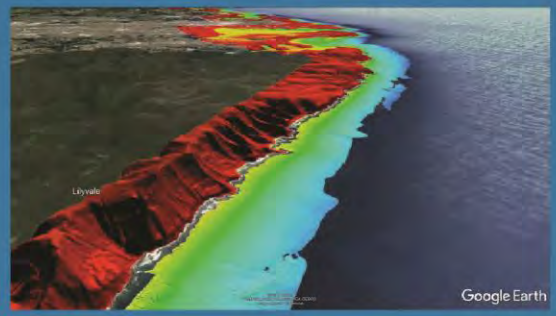
A nationally consistent baseline elevation data set for New Zealand. By 2024, 80% of the country will be covered and freely available on open licence.

HYPLAN Seafloor Mapping

LINZ's prioritised programme of seafloor mapping for improving safety of navigation outcomes. The mapping will deliver depth and other marine geospatial datasets which have a wider use to other stakeholders in the marine space.

Coastal mapping

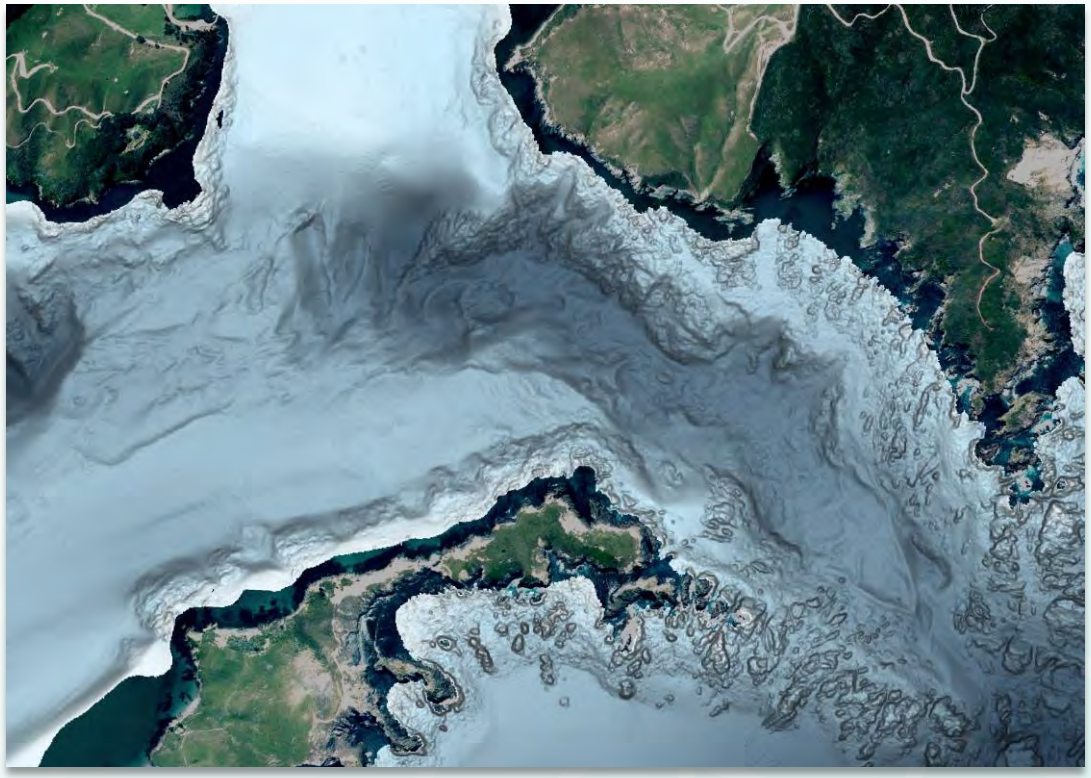
LINZ's coastal mapping project aims to map approximately 85% of New Zealand's coastline from 200m inland to a depth of 25m using mainly LiDAR technology to map elevation and depth across land and sea.

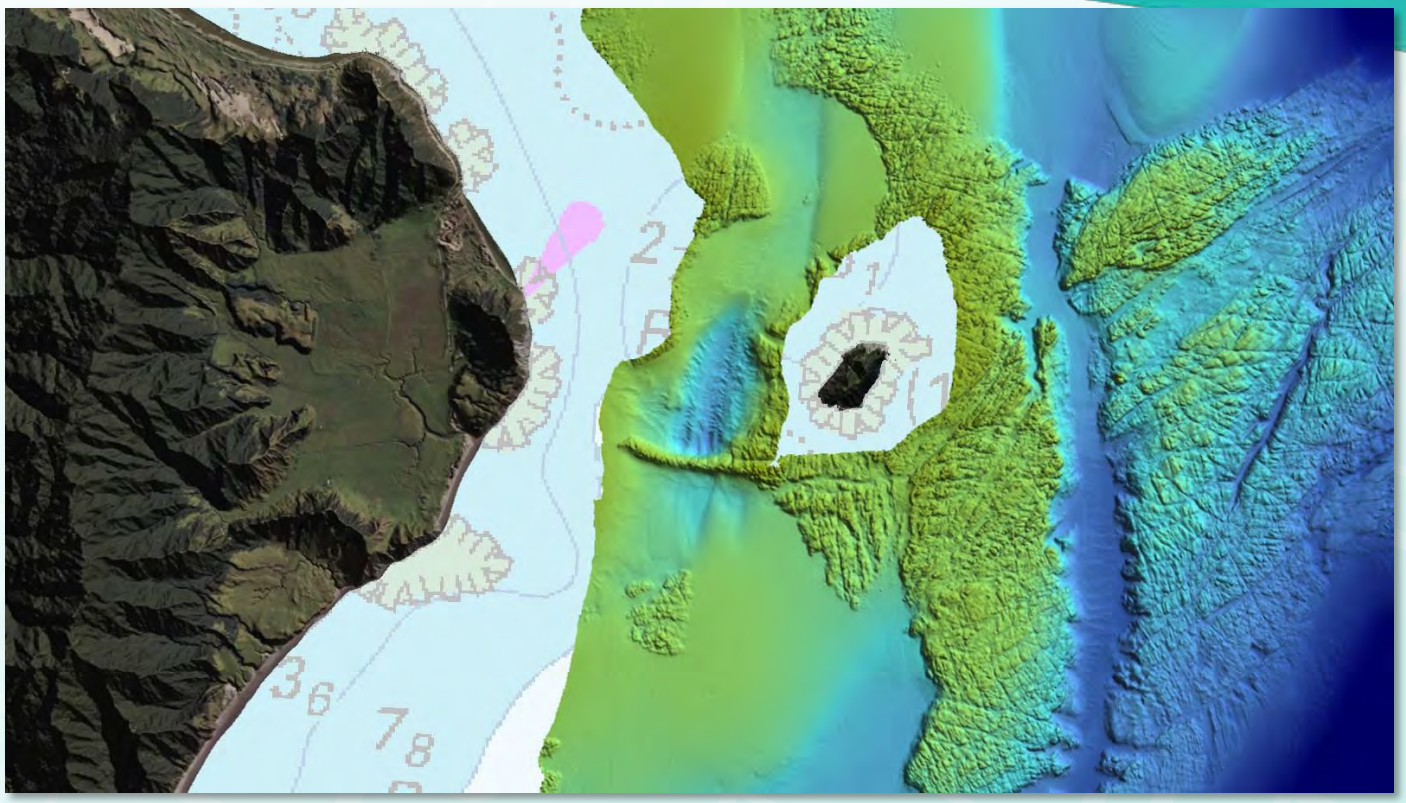


Seeking new data partnerships

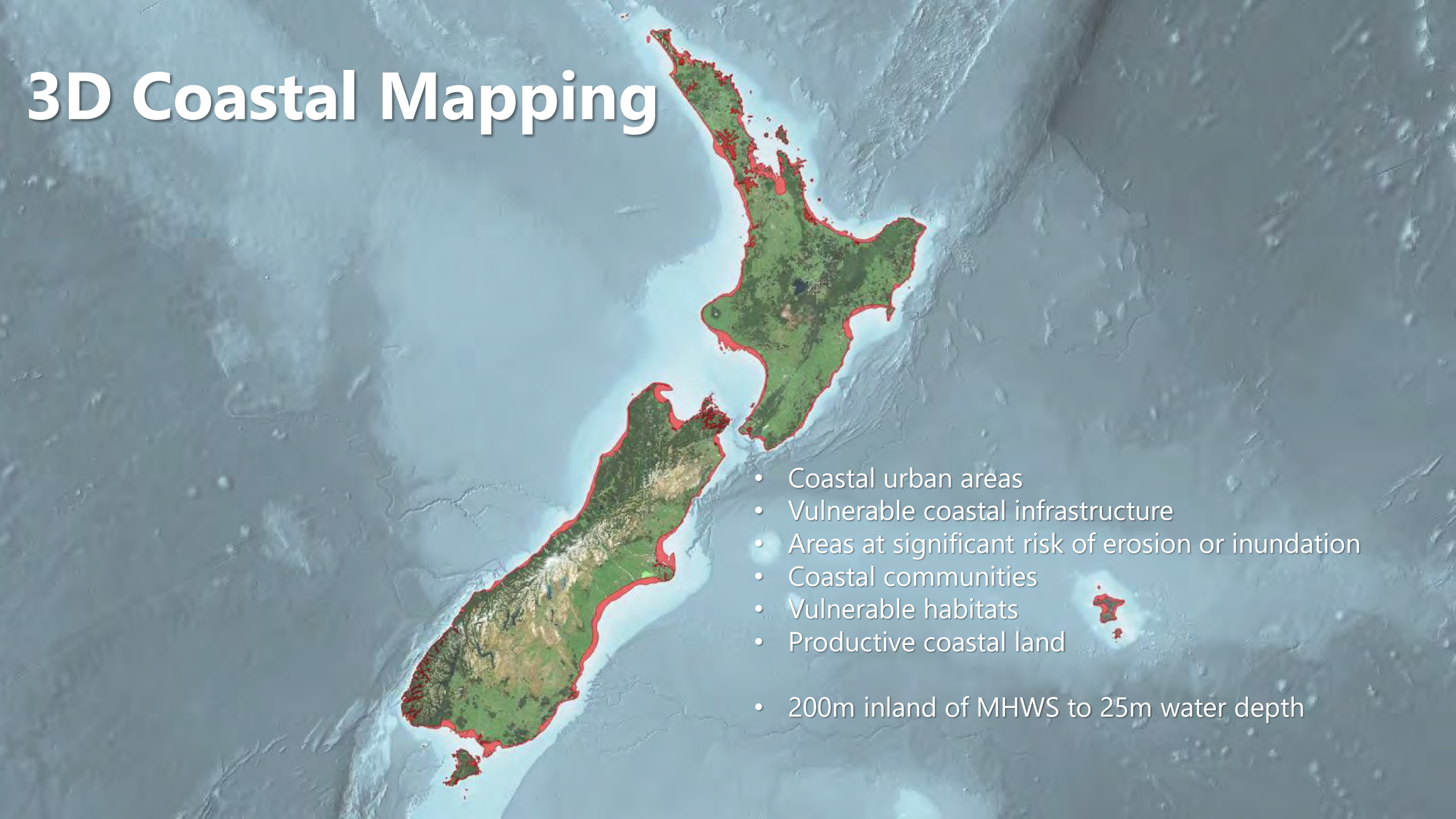
Do you have LiDAR data we could include? Planning future LiDAR data collection projects? Let's collaborate! Chat to the team to learn more.

Missing the coastal strip



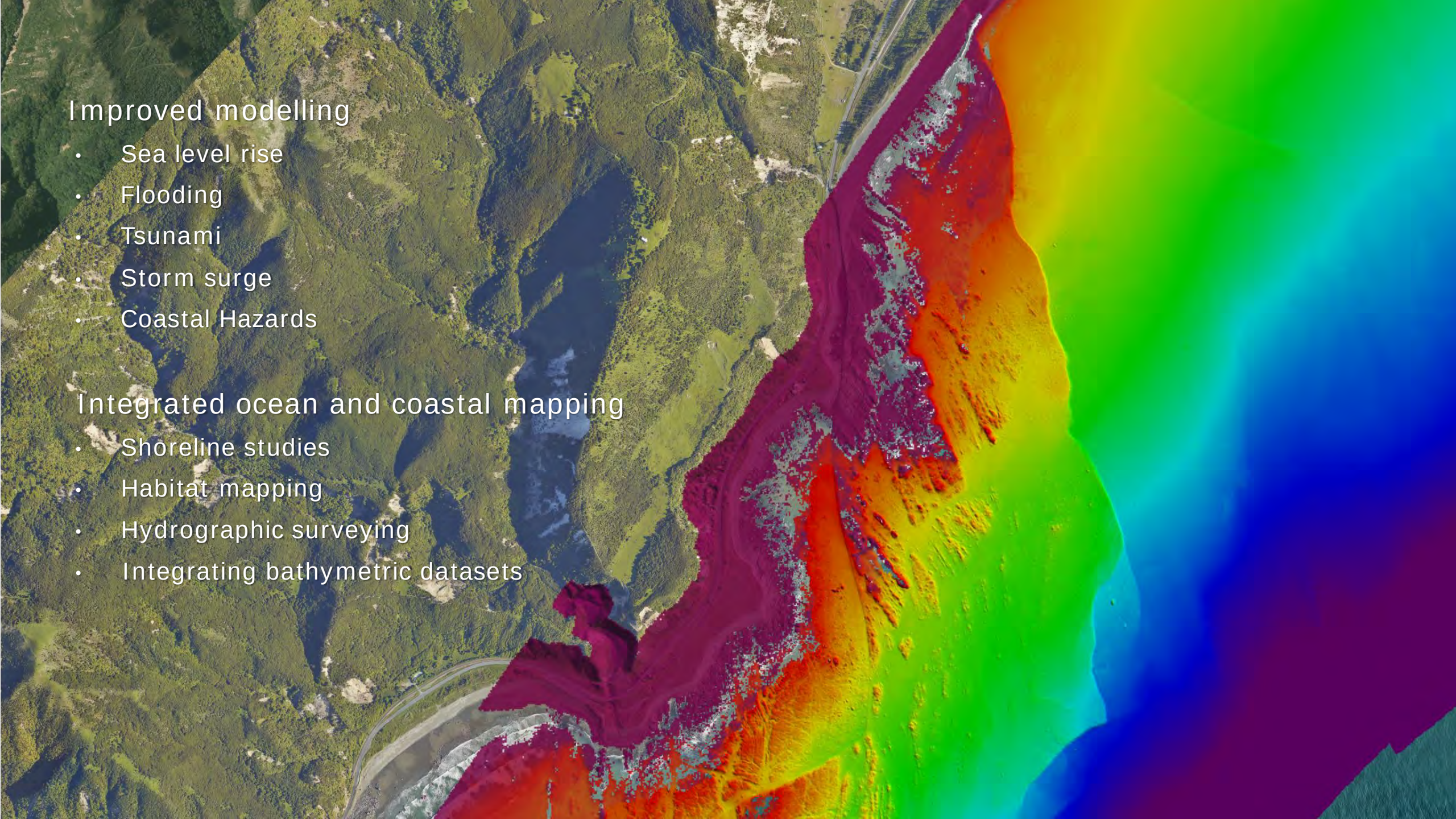


3D Coastal Mapping



- Coastal urban areas
- Vulnerable coastal infrastructure
- Areas at significant risk of erosion or inundation
- Coastal communities
- Vulnerable habitats
- Productive coastal land

- 200m inland of MHWS to 25m water depth



Improved modelling

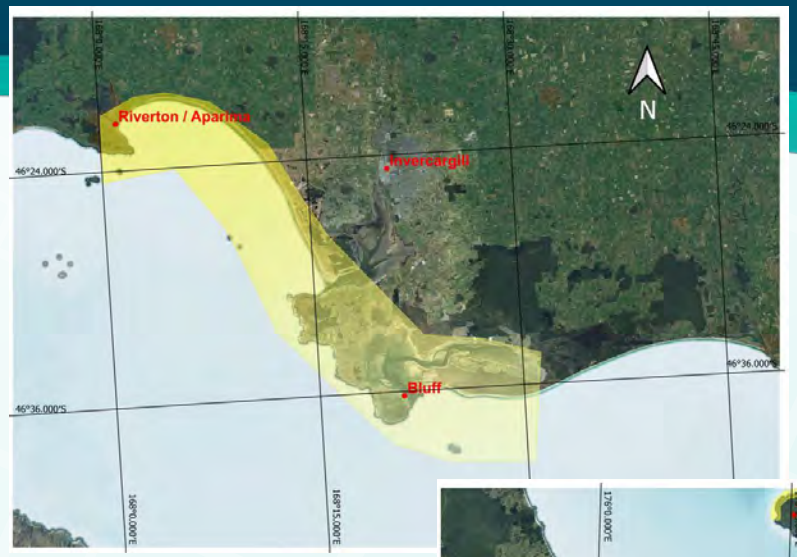
- Sea level rise
- Flooding
- Tsunami
- Storm surge
- Coastal Hazards

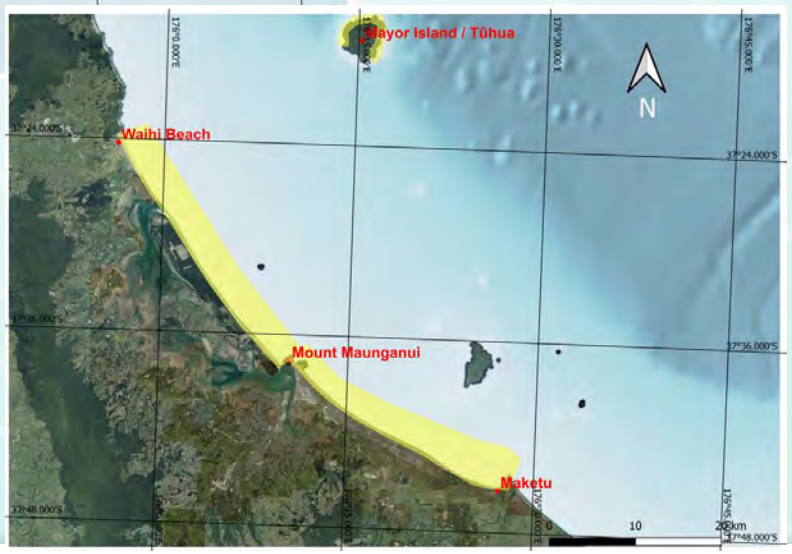
Integrated ocean and coastal mapping

- Shoreline studies
- Habitat mapping
- Hydrographic surveying
- Integrating bathymetric datasets

Details of 3D Coastal Mapping

- Primary data collection will be by bathymetric LiDAR mobilised on a fixed wing or helicopter.
- Outputs will be a bathymetric surface or DEMs, a point cloud and reflectance/intensity.
- Trial completed in Bluff/Tauranga areas
- DEMs from trial at 1m, 2m and 5m resolution. What's fit-for-purpose?
- Awaiting budget confirmation before knowing full scope.
- Prioritisation is yet to be finalised.



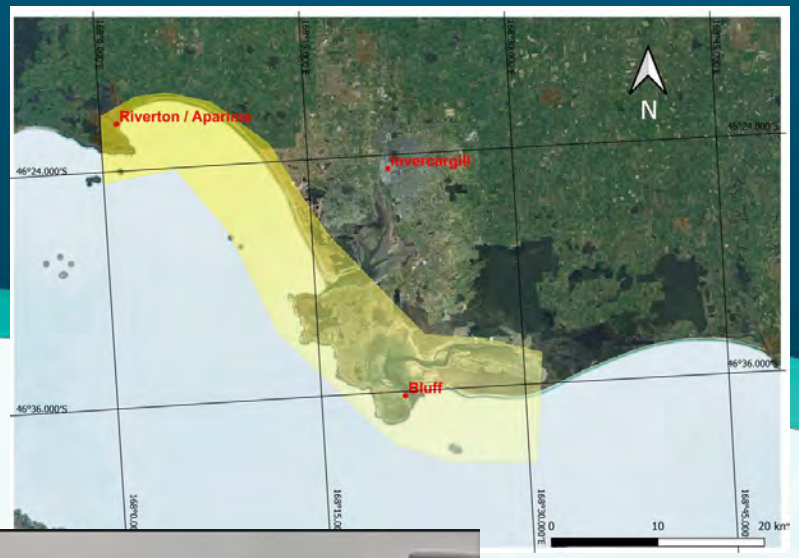


GNSS at Tide Gauges

- Update 4 existing GNSS receivers at 4 tide gauges
- Install 6 new GNSS receivers at existing long running tide gauges
- To gain a better understanding of absolute sea level rise
- Contract in place

Source: LINZ

Bathymetric Lidar Trial

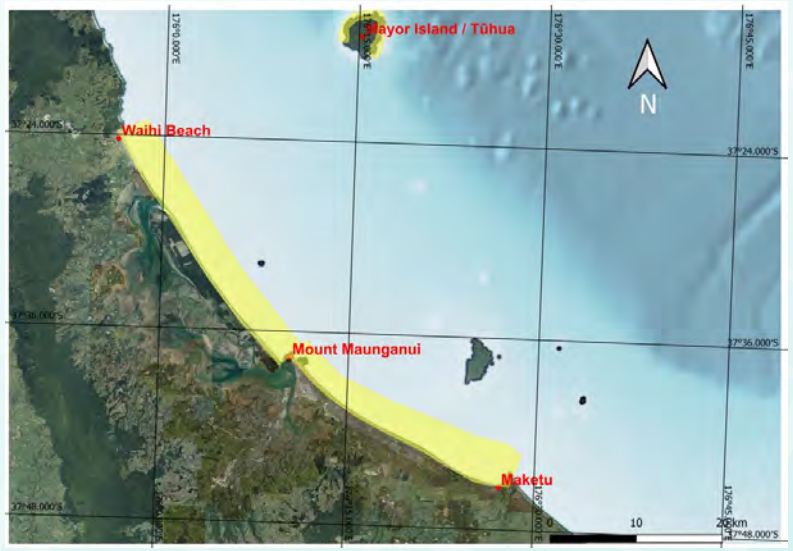


- Trial commenced in Invercargill
- Supplier – Fugro (RAMMS system)
- Weather didn't play along
- Learning things already!
- Limited area/timeframe is bad for coverage

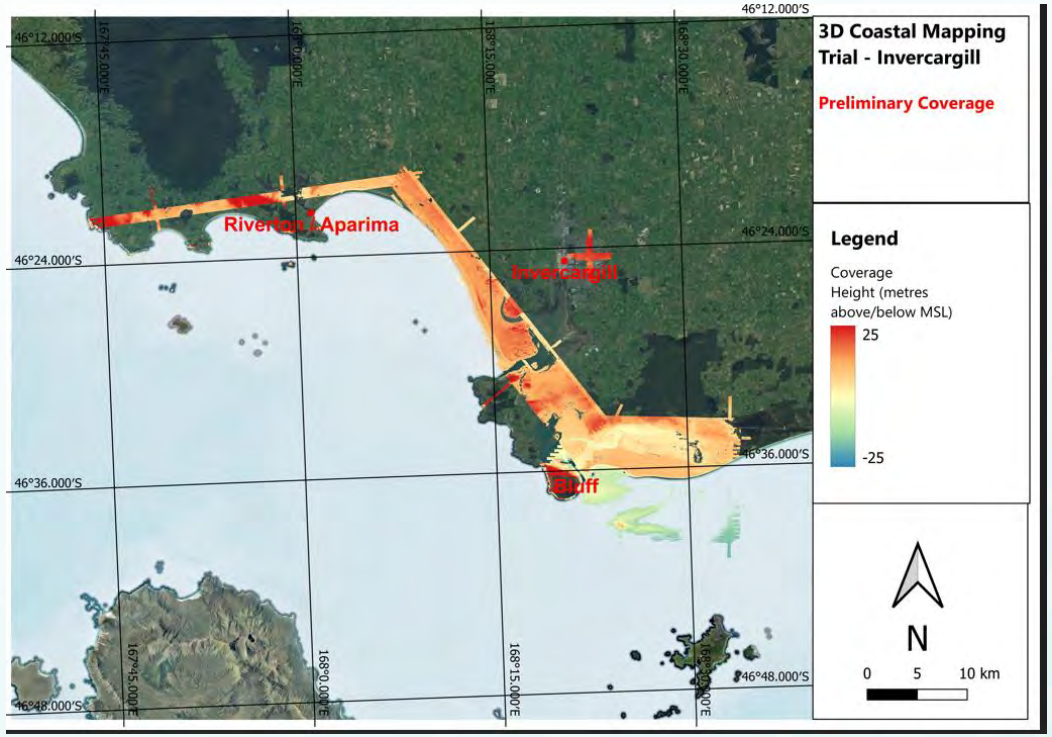
Bathymetric Lidar Trial

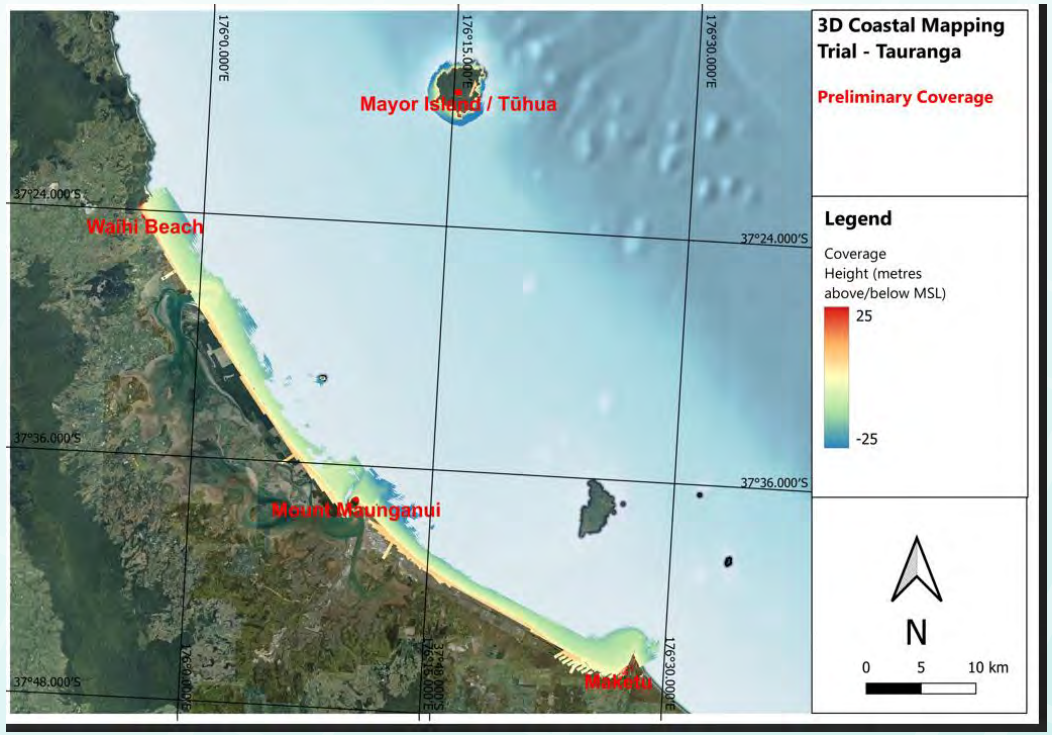
- Trial moved to Tauranga
- 5 flights – good coverage

- Data delivery in June
- **Very interested to get feedback on data**



Bathymetric Lidar Trial – Prelim coverage





Questions for this group

- What types of areas are most important to you? What factors contribute to these areas?
- What would you use the data for?
- What opportunities do you see from this project?
- Would you prefer deeper coverage or more coast?
- How can we serve the data up?

Questions?

Session 3

Data Collection

Feedback on today's meeting

In person ONLY

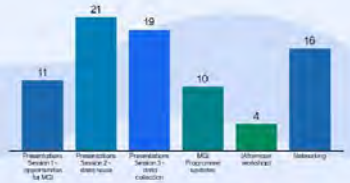
Join at menti.com
Code 3525 5717

Online ONLY

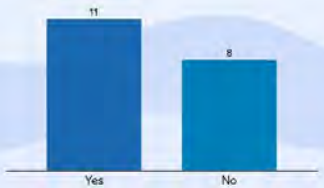
Join at menti.com
Code 7225 6945

What are your priorities today?

What was the most useful part of this meeting?



Have you been involved in the MGI Work Programme?



How would you rate today's meeting?

How would you like to contribute to the NZ MGI work programme?

What would you like covered in the next meeting?

39 responses

Thank you all today!

- Sponsors for supporting the in person event
- Speakers for time and contribution
- Wider NZ MGI Working Group for contributing and interest
- Steering Group for ongoing work
- Jenny Black and GNS Science admin team and social club
- LINZ - Berenika, Digi coms

Closing Karakia

Kia hora te marino	May peace be widespread
Kia whakapapa pounamu te moana	May the sea be like greenstone
Hei huarahi mā tātou i te rangi nei	A pathway for us all this day
Aroha atu, aroha mai	Let us show respect for each other
Tātou i ā tātou katoa	For one another
Haumi ē! Hui ē! Tāiki ē!	Bind us all together

Ngā mihi nui

Thank you!

Toitū Te Whenua
Land Information
New Zealand

Coordinated Seafloor Mapping - Workshop

NZ MGI 24

Stuart Caie
Mātanga Tātai Wāhi Mātāmua / Principal Geospatial Specialist
New Zealand Hydrographic Authority

3 May 2024

Agenda

Run order	
1	Introduction
2	Purpose of the workshop
3	Table discussions
4	Report back
5	Next steps

Introduction

- 2019 NZ MGI WG - coordinated seabed data acquisition as a priority improvement
- 2015 New Zealand Bathymetry Investigation recommended that there should be "greater coordination of bathymetry acquisition and dissemination in New Zealand"
- Workshop to look at the what, why, who, how and when?

Background

- It's new...sort of!
- CAB(95) M 48/35, Clause 10, LINZ "...shall determine priorities, work programme, and standards required for national sea-floor surveys in consultation with an Interdepartmental Committee comprising the Marine Safety Authority, The RNZN, Commercial users, and Government agencies dealking with hydography."
- The Official Hydrographic Information Advisors Group (OHIAG) was established circa 1996. Members included Ministry of Fisheries, DOC, Defence, MFAT, Ministry for Environment.
- OHIAG disbanded 2000, re-formed as Maritime Special Interest Group under Officials Committee for Geospatial Information.

Purpose of workshop

- Start the conversation on what does a coordinated approach to seafloor mapping look like?
- What are we doing?
- Why are we doing it?
- Who will do it?
- How will we do it?
- When will we do it?

What are we doing?

- Establish an Advisory Group under NZ MGI WG
- Purpose:
  - Improve coordination
  - Ensure a robust mechanism to assess and facilitate a coordinate effort
  - Identify and facilitate(?) opportunities for collaboration and partnerships
  - Provide a channel to share work programmes
  - Develop guidance on data capture(?)
- What it's not?
  - Funding mechanism

Why are we doing it?

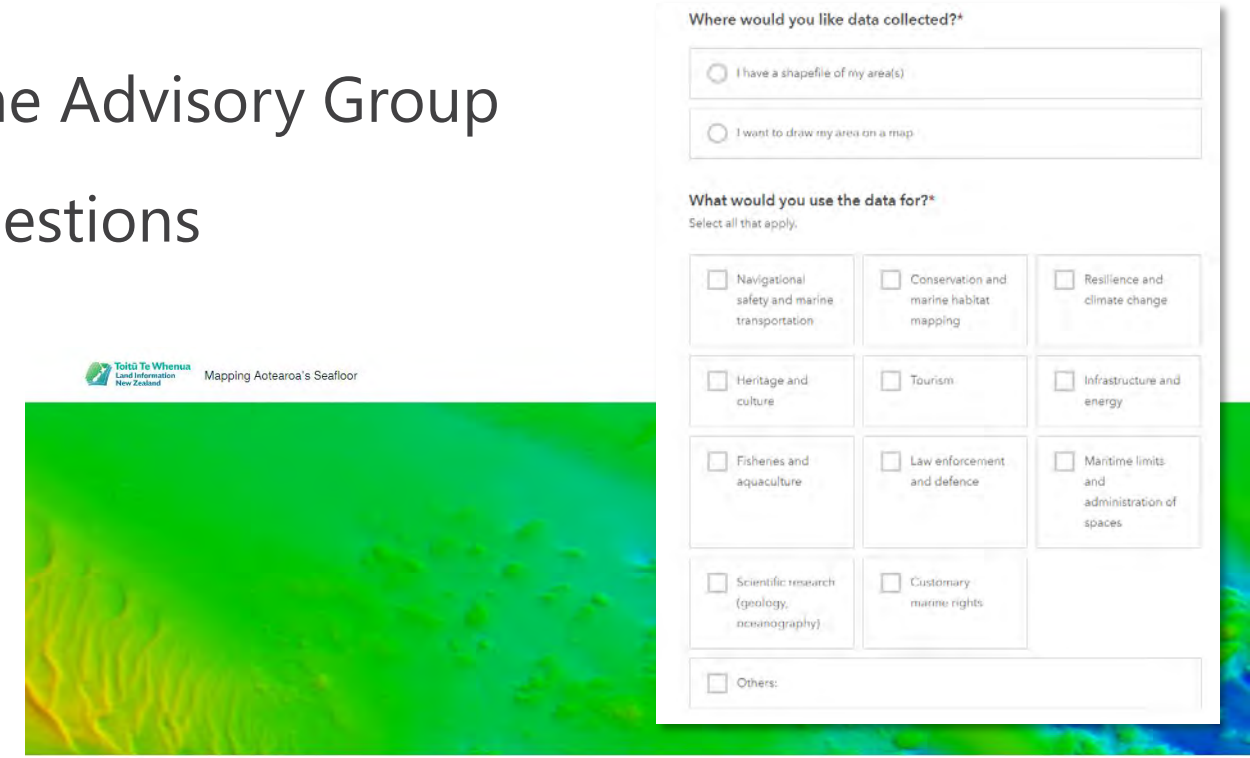
- Identified as a priority by the NZ MGI WG since 2019
- Reduce duplication of effort and spend
- To be better connected and more effective in mapping the seafloor

Who will do it?

- Open to all members of the MZ MGI WG
- Want a broad representation across sectors and interests
- Q: what expertise, knowledge is required?

How will we do it?

- Expression of Interest process to form the Advisory Group
- Determine criteria to assess survey suggestions



Mapping Aotearoa's Seafloor

A visual demonstration of Toitū Te Whenua LINZ's seafloor mapping programme

Overview HYPLAN areas Recent surveys Suggest a survey Case studies Contact us

When will we do it?

- Establish an Advisory Group by...
- Circulate EOI by...
- Frequency of meetings?

Table discussions

Table 1 - What

- What's the purpose of the Advisory Group?
- What are the Terms of Reference?
- Who is it advising?

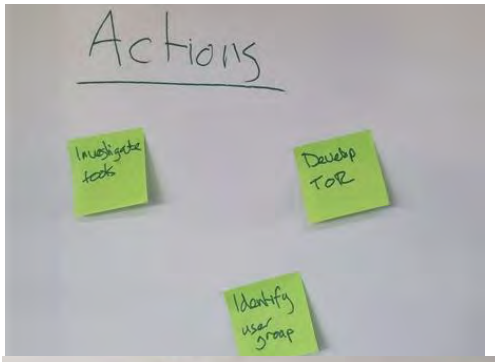
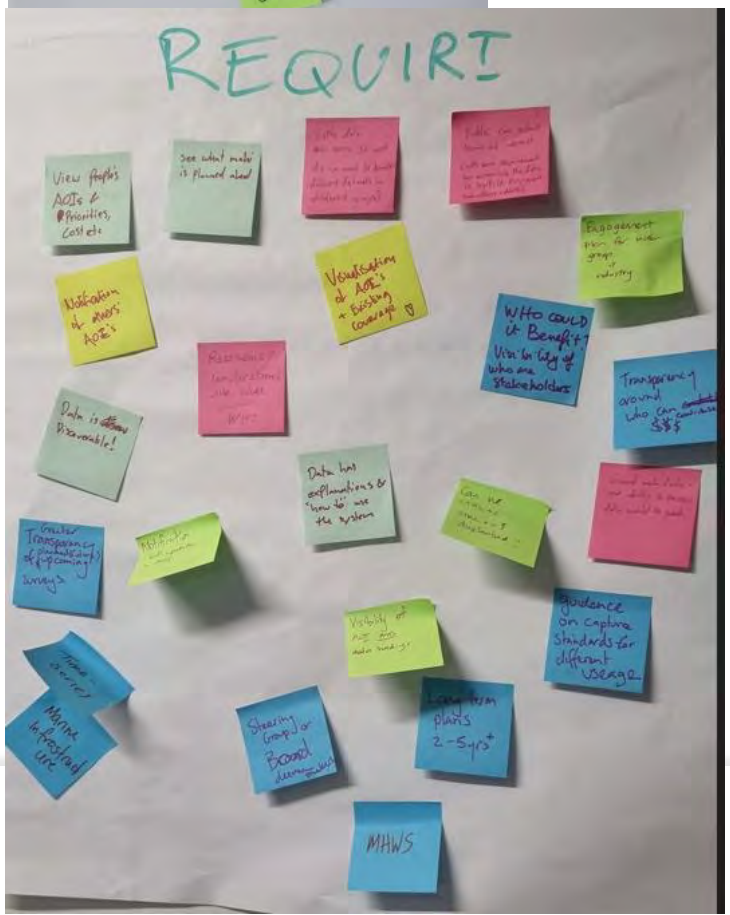
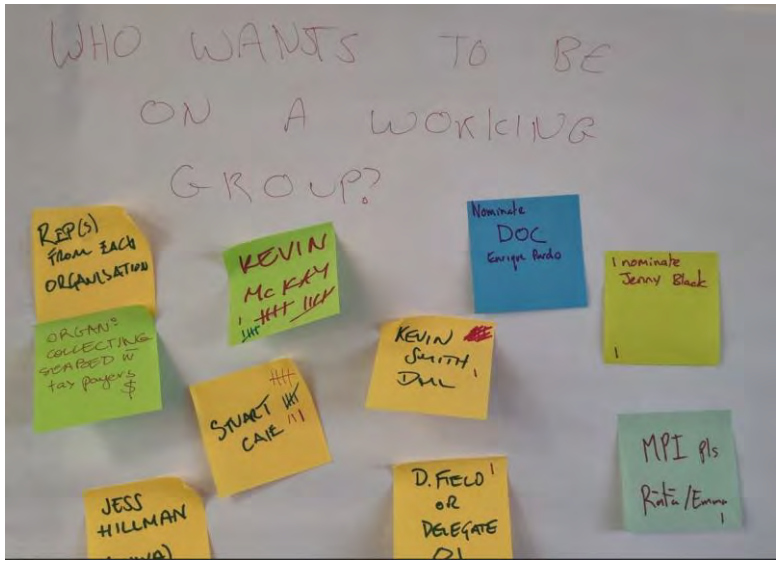
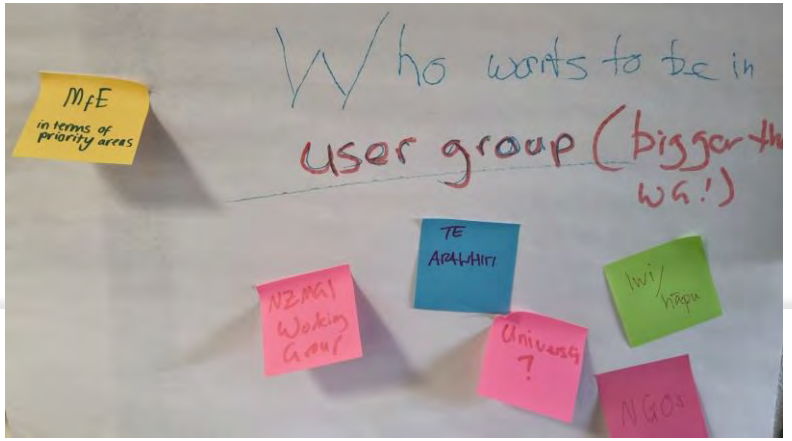
Table 2 - Who

- What expertise is required?
- Draft the Expression of Interest

Table 3 - How

- What's the mechanism
- Identify assessment criteria
  - How does it link to national policies?
  - How does it link to use cases?
  - ...

Feedback & Next steps

- Advisory Group established by…?
- EOI circulated by…

Feedback from attendees