NZ MARINE SCIENCES SOCIETY CONFERENCE

TE HUNGA MĀTAI MOANA O AOTEAROA

WILD SOUTH

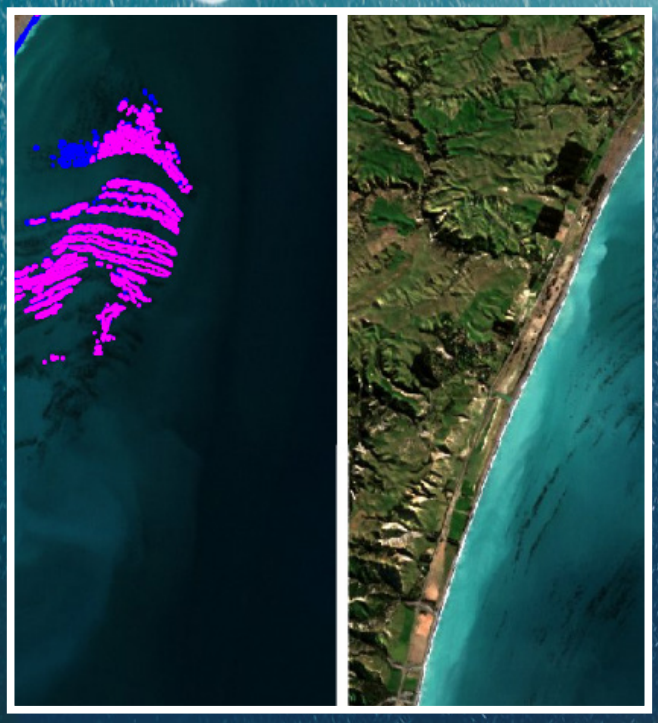
BIODIVERSITY, BLUE ECONOMIES AND BEYOND

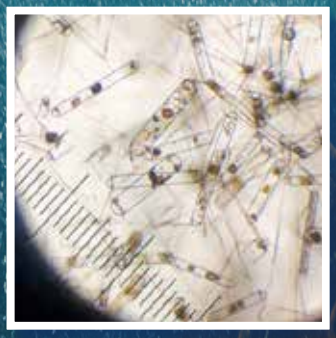
1-3 July 2026 | Waihōpai | Invercargill

HANDBOOK

CONTINUED COMMITMENT TO MARINE SCIENCE

Earth Sciences New Zealand





Earth Sciences New Zealand is the trusted authority for earth, water and atmospheric science across Aotearoa New Zealand. Formed in July 2025 through the merger of GNS Science and NIWA, our research spans six key missions, including Oceans & Fisheries and Land & Water.

To learn more, visit:
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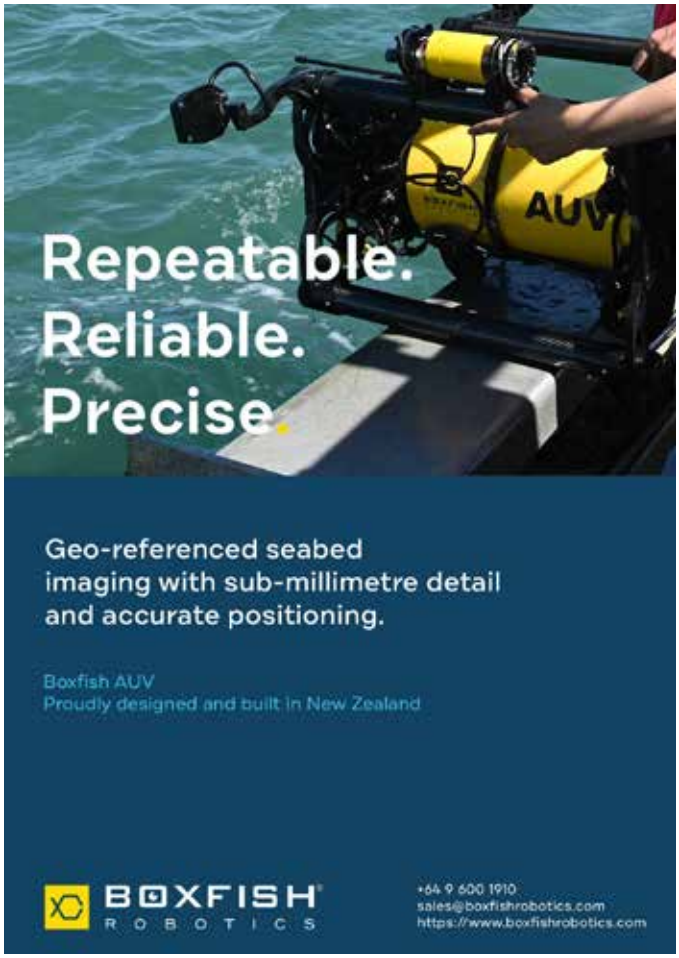
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WELCOME

Tēnā koutou katoa
Greetings

The NZ Marine Sciences Society looks forward to welcoming delegates, presenters and sponsors to Invercargill | Waihōpai as we investigate this year's conference theme:
"Wild South: Biodiversity, Blue Economies and Beyond."

Set against Southland's unique and dynamic marine environment, the conference will explore how science, policy/society, and innovation intersect to sustain our coastal and ocean ecosystems.

The programme will focus on presentations that advance understanding of marine ecology, resource management, conservation, climate resilience, and the blue economy — from local case studies to global perspectives.

We look forward to welcoming you all to Invercargill

Ash Rabel, Environment Southland

Conference Chair

GENERAL INFO

REGISTRATION DESK

If you require any assistance throughout the conference please see the conference organisers at the Registration Desk (foyer).

NAME TAGS

Delegates are requested to wear their name tags to all sessions and social functions.

CELL PHONES

Please ensure that cell phones are turned off or on silent, during all presentations.

CONFERENCE CONTACT

For assistance during the conference, please call Tracy Young from On-Cue Conferences on 021 164 7820

TAXIS & SHUTTLES

Blue Star: 03 217 7777

EXHIBITORS

Don't forget to visit and chat with the exhibitors.

MEALS

All catering will be in the Exhibition Area.

If you have advised us of your special dietary requirements, these have been forwarded to the caterers and will be available on a separate table individually marked.

At the Conference Dinner, please make yourself known to the wait staff and they will make the necessary arrangements for your special meal.

If you have any dietary requirements that we are not aware of, please see the Conference Organisers at the Registration Desk on arrival at the conference.

MEDICAL & EMERGENCY INFO

NEW ZEALAND EMERGENCY SERVICES

Ambulance, Fire and Police. Dial 111 from any public, private telephone or mobile phone in New Zealand.

INVERCARGILL POLICE

117 Don St, Invercargill
Open to the public Monday to Friday 7am-9pm

Phone: 105

SOUTHLAND HOSPITAL

Kew Road, Kew, Invercargill 9812
Phone: 03 218 1949

INVERCARGILL URGENT CARE CENTRE

65 Don Street, Invercargill
Phone: 03 214 0040
Hours: Monday to Friday 6:00 PM - 9:00 PM
Weekends and Public Holidays 12:00 PM - 4:00 PM

CHEMIST/PHARMACY

Sylvan Bank Pharmacy
Phone: 032177100
Hours: Monday to Friday 9:00 AM - 5:30 PM
Saturday 10:00 AM - 1:00 PM
Sunday Closed

GENERAL INFO

LOADING PRESENTATIONS

Please take your presentation on a USB stick to the registration desk - this should be done at the start of the day that you are scheduled to present, and at least 2 sessions prior to your presentation time.

POSTER PRESENTATIONS

The poster session will be on Wednesday afternoon as part of the welcome function.

Please put your poster up on arrival. Posters should remain up all week and be removed after lunchtime Friday. Any posters remaining by 3pm will be removed.

SOCIAL MEDIA

The NZMSS Conference Committee encourage sharing of knowledge across social media platforms.

Use of the following hashtag across all social media platforms will help to spread the word about this year's conference.

#NZMSS2026

SESSION CHAIRS

Please can all session chairs be in their room prior to the start of the session. Please introduce yourself to the AV tech in the room

It is very important that presentations do not run over their allocated time so please ensure presenters start and finish on time. Further chair guidelines will be avaliable in each room.

RESTURANT DISCOUNT FOR DELEGATES

Tuatara Café
30 Dee Street, Invercargill

10% off all Gadoochi craft beers and ciders from 1 – 3 July for all delegates.

Delegates will need to show their conference name tag/lanyard at the bar to activate the discount.

VENUE INFORMATION

VENUE INFORMATION

Transport World
491 Tay Street, Invercargill

INTERNET

WiFi name: TWGuest

Password: TWEvents

PARKING

Parking is available. Please be aware of time limits and parking charges.

NO SMOKING

Transport World is a non-smoking premise.

Smoking is only permitted outside.

VENUE EMERGENCY INFORMATION

In the event of an evacuation alarm, there will be building wardens directing everyone out of the building to assembly points.

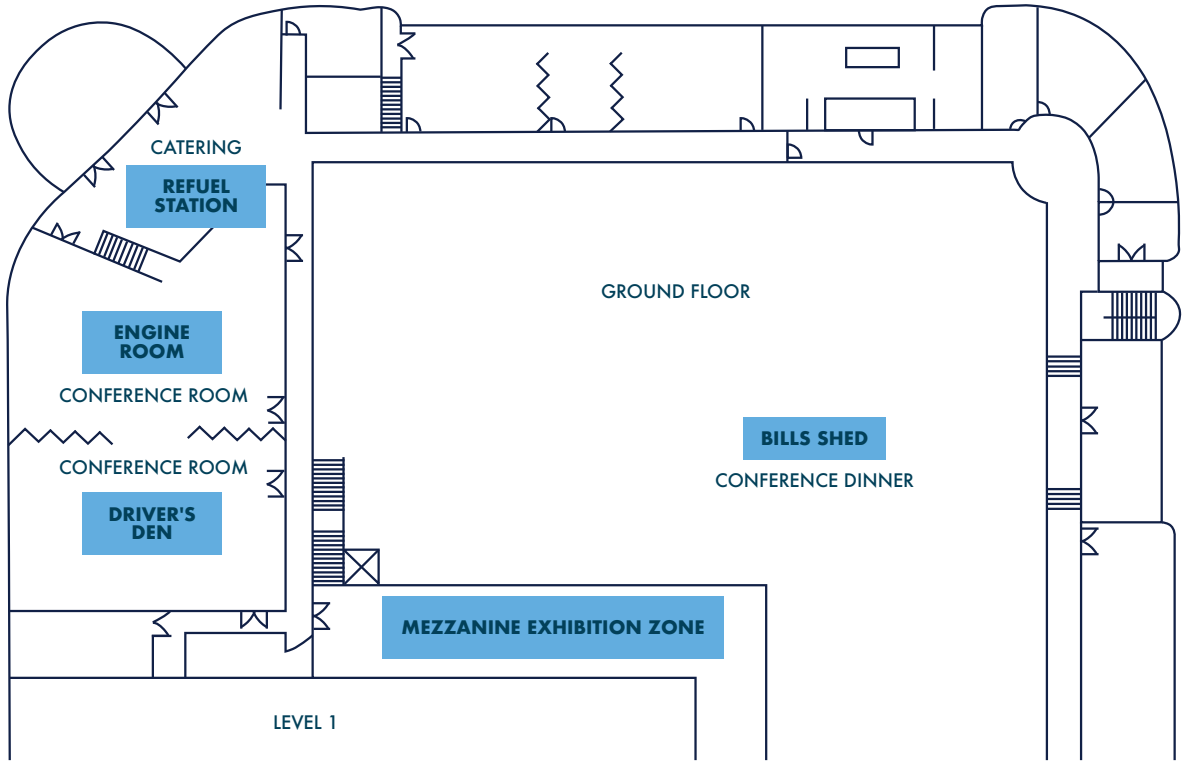
Please move outside to the street.

Fire: Continuous alarms will be activated throughout the building and all occupants should leave the building immediately.

Earthquake: In the event of an earthquake, stop, drop and cover. When the shaking stops, follow the instructions of the emergency wardens and make your way out of the building to the assembly point.

VENUE MAP

TRANSPORT WORLD



Exhibitors

Biosecurity New Zealand
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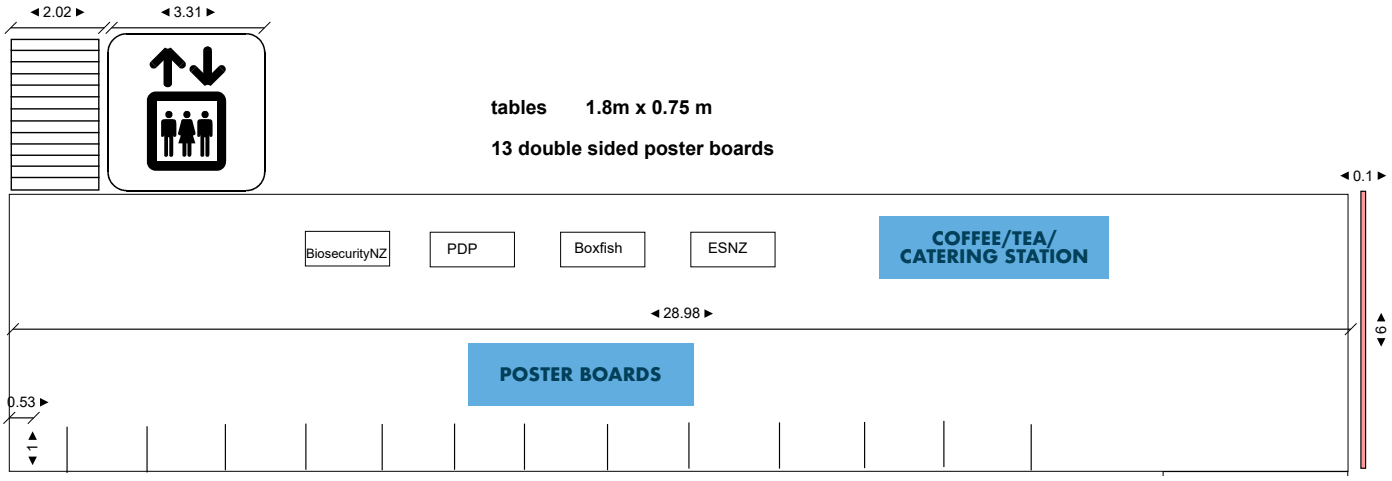
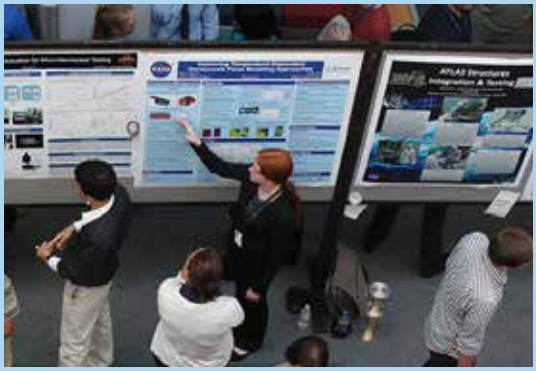


SOCIAL FUNCTIONS



WELCOME FUNCTION & POSTER SESSION

Venue: Transport World
Time: Wednesday 1 July 4.30pm - 6.30pm

Enjoy networking, canapes and 1 arrival drink included for all delegates, followed by a cash bar

Ticket included with all Full Conference Registrations

STUDENT / EARLY CAREER RESEARCHER NETWORKING LUNCH

Venue: Transport World
Time: Wednesday 1 July 12pm - 1pm

Enjoy networking, lunch, and getting to know your fellow, early career Marine Scientists.

CONFERENCE DINNER AND AWARDS CEREMONY

Venue: Transport World, Invercargill
Time: Friday 3 July from 6:30 PM

Transport:
- 6:15 PM pick up outside Tuatara Café
- 6:20PM 268 Tay Street
- 11PM return to Invercargill to same stops

Tickets: Your booking will be noted on your nametag. If you are not booked for dinner but would like to attend please ask at the registration desk.

Dinner:

Celebrate with colleagues and enjoy dinner among the vehicles at Bill Richardson Transport World.

Get your dancing shoes ready! There will be live music after dinner from local legends 'In the Pocket'

Prizes: Best dancer and Best dressed

PROGRAMME

Correct as at 24th June 2026

	Tuesday 30 June 2026	
	Exhibitors and suppliers set up	
	Wednesday 1 July 2026	
	OPENING CEREMONY	
8:30am- 9:15am	Mihi Whakatau and Karakia Timatanga - Society Welcome	
9.15am - 10.15am	**James Bell - *Below the kelp zone and before the deep sea: exploring the mesophotic communities of Aotearoa New Zealand*** **Chair: Ash Rabel**	
10.15am- 11.00am	Kai whakanōa | morning tea break: kindly sponsored by Tohu Environmental	
Location	Driver's Den	Engine Room
Session Chair	Jane Kitson	Matt Pinkerton
Session 1	**Changing Oceans**	**Coastal Waters**
11.00am-11.15am	Sponge holobionts tolerant to 2100 ocean conditions of warming, acidification and deoxygenation *Barbara Graham - Victoria University of Wellington**	(Plankto) Scoping Estuarine Plankton Communities as Bioindicators of Water Quality *Anne Fleur van Leeuwan - University of Auckland **
11.15am-11.30am	Climate-smart marine spatial planning for biogenic habitat-forming species in Aotearoa New Zealand *Melanie Hayden - Earth Sciences NZ*	Long-term patterns and methodological constraints in coastal water quality trends: Evidence from Tāmaki Makaurau (Auckland) *Nadia Divereva - Auckland Council*
11.30am-11.45am	Mechanisms of change in the rocky intertidal: poleward range contraction of a subantarctic limpet *Spencer Virgin - University of Canterbury*	Do Internal Waves Cool Reefs? Insights from Tawhiti Rahi/ Poor Knights Islands *Hannah Melzer - University of Otago**
11.45am - 1.00pm	Lunch Break + ECR & Student Networking	
Location	Driver's Den	Engine Room
Session Chair	Dana Clark	Megan Melidonis
Session 2	**Sediment, sedimentation & soft-sediment systems**	**Biogenic ecosystems**
1.00pm-1.15pm	Sediment as a driver of benthic community structure in Temperate Mesophotic Reefs of Aotearoa New Zealand *Yasmin Ahlman - Victoria Unversity of Wellington**	Improving the bioreceptivity of artificial substrates: Role of marine biofilms on bio-enhanced concretes with calcium carbonate from mussel shell powder *Patricio Ávila-Guerrero - Universidad Santo Tomás**
1.15pm-1.30pm	The breathing seascape: spatial and temporal up-scaling of an estuarine ecosystem function *Drew Lohrer - Earth Sciences NZ*	Genome-Wide Analysis of Population Structure and Gene Flow in the New Zealand Black Coral Antipathella fiordensis *Miriam Pierotti - Victoria University of Wellington**
1.30pm-1.45pm	Disturbance-recovery dynamics of estuarine ecosystem functioning post Cyclone Gabrielle: Informing and validating a spatial decision support tool. *Grady Petersen - Earth Sciences NZ*	Continuing the longterm study of deep-sea coral recovery on the Graveyard Knolls using the German RV Sonne *Kareen Schnabel - Earth Sciences NZ*
1.45pm-2.00pm	Fine-scale seagrass monitoring in Tauranga Harbour: insights, limitations, and future directions *Rigoberto Sanchez-Medina - Bay of Plenty Regional Council*	Hot Fuzz: Climate-Driven Proliferation of Filamentous Red Algae in Urchin-Dominated Reefs *Pippa Benton - The University of Auckland**
2.00pm-2.15pm	Mapping subtidal seagrass using boat based hydroacoustics and video systems. A case study from Te Rerenga Parāoa (Whangārei Harbour). *Inigo Zabarte-Maeztu - Earth Sciences NZ*	Autonomous Underwater Vehicle for Repeatable Seabed Monitoring *Xinglon Chang - Boxfish Robotics Limited*
2.15pm-2.30pm	Restoration meets reality: Seagrass Restoration Trial in Waihī Estuary *Inigo Zabarte-Maeztu - Earth Sciences NZ*	Māra Moana: Building and studying a hanging ocean garden with Whakarongo, Titiro and Korero *Howard Reti - Mohimohi Moana Foundation*
2.30pm-2.45pm	Why are marine parasites thriving in our freshwater taonga? *Jerusha Bennett - University of Otago* *Luka Finn - Hokonui Rūnanga*	Mapping change in New Zealand estuaries, sounds and fiords using high-resolution Sentinel-2 satellite observations *Matthew Pinkerton - Earth Sciences NZ*
2.45pm-3.00pm	Photic - mesophotic transitions show shallowing of kelp forests in response to sedimentation *Leigh Tait - Earth Sciences NZ*	

3.00pm - 3.30pm	Afternoon Tea	
Location	Driver's Den	Engine Room
Session Chair	Erin Bell	Tom Brough
Session 3	**Fish, fisheries & harvested living resources**	**Biodiversity planning**
3.30pm-3.45pm	Spatial assessment of recreational fishing displacement from marine protected areas *Matt Bennion - Earth Sciences New Zealand*	Developing a National Evidence Base for High Value Marine Biodiversity *Shane Geange - Department of Conservation*
3.45pm-4.00pm	Ecosystem Approaches to Fisheries Management on Inshore Reefs *Jean Davis - Fisheries NZ*	Developing an evidence-based decision support tool for marine ecosystems in Aotearoa New Zealand: A matrix approach *Emily Douglas - Earth Sciences NZ*
4.00pm-4.15pm	One Size Does Not Fit All: Setting Biologically Informed Minimum Harvest Sizes for Sustainable Pāua Fisheries *Shawn Gerrity - University of Canterbury / Paua Industry Council*	Achieving full representativity of seafloor biodiversity with minimal expansion: exploring a strategy for New Zealand marine conservation *Shane Geange - Department of Conservation*
4.15pm-4.30pm	Snapper as sentinels for kelp forest ecosystem changes *Kathryn Scafidi - University of Otago**	A functional trait framework for quantifying and valuing temperate mangrove ecosystem services *Zoe Qu - Earth Sciences NZ*
4.30pm - 6.30pm	Poster Session and Icebreaker/Welcome Function (drinks & canapes) - Mezzanine Foyer	

	Thursday 2 July 2026	
9.00 - 10.00am	**Jenni Stanley - *Beyond the Visible Ocean: Sound as a Missing Dimension in Marine Ecosystem Science*** **Session Chair: Sam Thomas**	
10.00am - 10.30am	Morning Tea - kindly sponsored by Boxfish Robotics	
Location	Driver's Den	Engine Room
Session Chair	Shane Geange	Jean Davis
Session 4	**Restoration ecology, habitats & methods**	**Aquaculture & seaweed production systems**
10.30am-10.45am	Community responses to restored small-scale oyster, Ostrea chilensis, habitats deployed onto mussel shells in southern Chile *Emilee Benjamin - The University of Auckland*	Utilisation of insect meals in australasian snapper (Chrysophrys auratus) and chinook salmon (Oncorhynchus tshawytscha) aquafeeds produced in new zealand. *Erin Bell - Bioeconomy Institute of NZ*
10.45am-11.00am	Rapid Reef Recovery Following Removal of Long-Spined Urchins (Centrostephanus rodgersii) in Northeastern New Zealand *Toby Dickson - The University of Auckland*	Growth, feed conversion and foraging of tāmure/snapper on pellets versus Greenshell mussels *Damian Moran - Bioeconomy Institute of NZ*
11.00am - 11.15am	Rewilding Bluff Harbour via active marine restoration: Sea Nest/Kōhanga Moana Pilot Study *Bryony Miller - e3 Scientific*	Selection of new microalgal strains for mussel spat nurseries *Leslia Sampollo - University of Auckland**
11.15am-11.30am	From Shell to Shelter: Investigating fish recruitment on degraded seafloor restored with mussels and shell material *Altan Ní Mhurchú - University of Auckland**	Fatal Attraction? Shellfish Aquaculture Creates Significant Recreational Fishing Amenity. *Ash Heaphy - University of Auckland*
11.30am-11.45am	Rafting on plastic: marine debris in invasion ecology *Malindi Gammon - Cawthron*	Investigating the potential of Asparagopsis armata as a candidate for integrated multi-trophic aquaculture (IMTA) of seaweeds and mussels in Aotearoa New Zealand. *Tyler Feary - University of Auckland**
11.45 - 1.00pm	Lunch + NZMSS AGM	
Location	Driver's Den	Engine Room
Session Chair:	Steph Bennington	Anna Madarasz-Smith
Session 5	**Marine heatwaves and climate change**	**Estuaries**
1.00pm-1.15pm	Increased stratification intensifies surface marine heatwaves north- east of Aotearoa New Zealand in New Zealand's Earth System model *Liv Cornelissen - University of Otago**	Transforming Coastal Monitoring: Integrating eDNA and conventional indicators for estuary health assessment *Dana Clark - Cawthron*
1.15pm-1.30pm	Intertidal heatwave effects on shellfish and greenhouse gas fluxes *Emily Douglas - Earth Sciences NZ*	A flexible spatial data framework for estuaries: evaluating ecological risk and restoration potential in a changing world *Drew Lohrer - Earth Sciences NZ*
1.30pm-1.45pm	Marine heatwave impacts in the seabird capital of the world: how are our seabirds responding? *Brendon Dunphy - University of Auckland*	Variation in estuarine environmental conditions drives divergent metabolic phenotypes in a key benthic bivalve *Orlando Lam-Gordillo - Earth Sciences NZ*

Session 5 (cont'd)	**Marine heatwaves and climate change (cont.)**	**Janet Grieve Special Session/ Fiords & biogeochemical processes**
Session Chair:	Steph Bennington	Scott Nodder / Kareen Schnabel
1.45pm-2.00pm	Physiological and microbiome responses of the black coral Antipathella fiordensis to marine heatwaves *Amber Kirk - Victoria University of Wellington**	Around Te Waipounamu in 17 days, highlights and an update on a multidisciplinary survey of cold-water coral communities of Aotearoa New Zealand on the German RV Sonne *Kareen Schnabel - Earth Sciences NZ*
2.00pm-2.15pm	Climate change risks to marine habitats in the Bay of Plenty Region *Vanessa Taikato - Bay of Plenty Regional Council*	The Cross-Shelf Exchange (C-SEX) database: 27 years of New Zealand coastal ocean surveys, states and trends *John Zeldis - Earth Sciences NZ*
2.15pm-2.30pm	Membrane remodeling mediates differential acclimation and resilience to marine heatwaves in temperate sponges *Gabriela Wood - Victoria University of Wellington**	Using natural analogues to investigate marine Carbon Dioxide Removal approaches in Aotearoa New Zealand *Scott Nodder - Earth Sciences NZ*
2.30pm-2.45pm	Tohe i te Toheroa: Assessing the vulnerability of a taonga species to climate change *Tessa Thomson - Earth Sciences NZ*	Carbon cycling and burial in Aotearoa / New Zealand fjords *Chris Moy - University of Otago*
2.45pm-3.00pm	Half a century of community change in the northeastern Pacific Ocean *Steph Bennington - Earth Science NZ*	Environmental magnetism as a redox proxy, Patea/Doubtful Sound, Fiordland, New Zealand: implications for carbon sequestration *Alana French - University of Otago**
3.00pm-3.30pm	Afternoon Tea - kindly sponsored by Sequench	
Location	Driver's Den	Engine Room
Session Chair	Josie Crawshaw	Alice McCulloch and Emma Carroll
Session 6	**Marine policy, planning & governance**	**Virtual Reality (VR) Marine Experience - BLAKE**
3.30pm-3.45pm	Coastal management and the wrong solutions to the wrong problems *David Schiel - Canterbury University*	VR Marine Experience 3.30pm - 4.30pm session 1 4.30pm - 5.30pm session 2 Sign up for one of the 1 hr sessions at the registration desk. Limited spaces available so be sure to sign up on arrival at conference.
3.45pm-4.00pm	How to answer Policy questions using research - White Shark cage diving as an example *Ash Rabel - Environment Southland*	
4.00pm-4.15pm	Hau Moana - Next-generation spatial planning for offshore wind development in New Zealand *Tom Brough - Earth Sciences NZ*	
4.15pm-4.30pm	Our Blue Economic future is at risk *Chris Battershill - University of Waikato*	
4.30pm-4.45pm	Where are we now? Aotearoa and the UN Decade of Ocean Science for Sustainable Development 2021-2030 *Tessa Thomson*	
4.45pm-5.00pm	Signals from the Horizon: What's emerging for Aotearoa New Zealand's marine science? *Megan Oliver - Greater Wellington Regional Council*	
5.00pm - 5.15pm	Diets of the rugose clubhook squids Onykia robsoni species complex in Aotearoa New Zealand *Samuel Clough - Auckland University of Technology*	
5.15pm - 5.30pm	Where have all the seahorses gone? Assessing the status of Hippocampus abdominalis in the Hauraki Gulf Tīkapa Moana *Hayley Nessia - Kelly Tarlton's Marine Wildlife Trust*	
from 5.30pm	Free Evening - no scheduled events	

	Friday 3 July 2026	
9.00am-10.00am	**Di Tracey - NZMSS Award Matai Mōana Winner 2025 - *Decades in the Deepsea - career reflections*** **Chair: Pete Wilson**	
10.00am - 10.30am	Morning Tea - kindly sponsored by Environment Southland	
Location	Driver's Den	Engine Room
Session Chair	Megan Oliver	Chris Battershill
Session 7	**Monitoring, modelling & decision-support**	**Community, mātauranga & engagement**
10.30am-10.45am	Restoring Flow, Restoring Function: Ecological Outcomes of the Kaituna River Rediversion to Maketū Estuary *Josie Crawshaw - Bay of Plenty Regional Council*	The Tawaki Project – Studying New Zealand's elusive "jungle penguin" *Ursula Ellenberg - University of Otago*
10.45am-11.00am	Validation of the Hydrodynamics of the Kaituna River Re-diversion and Maketū Estuary Enhancement Project to Meet Consent Conditions *Ben Tuckey - DHI*	Embedding Vision Mātauranga in Blue Carbon Research: Ōraka-Aparima Engagement in the Fiordland Carbon Sink Research Programme *Jane Kitson - Tohu Environmental*
11.00am - 11.15am	From Catchment to Coast: Insights from Otago's Blue Edge Review *Anna Madrasz-Smith - Pattle Delamore Partners Limited*	Catchment Management - Working together in partnership for Te Taiao *Megan Melidonis - Greater Wellington Regional Council*
11.15am-11.30am	From Science to Decisions: Comparing Marine Ecological Impact Assessment in New Zealand and International Contexts *Emily Jones - SLR Consulting*	Shark Spy Rakiura: Extending students with marine research *Rob Lewis - University of Otago*
11.30am-11.45am	When Species Move, Maps Must Too: Dynamic Marine Spatial Planning for Aotearoa New Zealand *Matt Bennion - Earth Sciences New Zealand*	Shark Spy Rakiura: Extending students with marine research (cont.)
11.45am - 12.00pm	Navigating a Global Invader: What Aotearoa's Exotic Caulerpa Response Gains from Cross Border Knowledge Sharing *Irene Middleton - Biosecurity NZ*	
12.00-1.00pm	Lunch	
Location	Driver's Den	Engine Room
Session Chair:	Irene Middleton	Scott Nodder
Session 8	**Species management**	**Advances in technology**
1.00pm-1.15pm	First seasonal data on seabird diversity in Foveaux Strait, a New Zealand avian hotspot. *Felix Borrowdale - University of Otago**	PasSIV: Experimental Validation of a Novel Passive eDNA Sampler- Chasing eDNA Signals Across Marine Systems from Tobacco to Mussel Larvae *Ulla von Ammon - Cawthron*
1.15pm-1.30pm	Photo-identification mark-recapture to estimate population parameters and site fidelity of broadnose sevengill sharks (Notorynchus cepedianus) in Dusky Sound, Fiordland. *Jemma Bezuidenhout - University of Otago**	From Macro to Micro: the use of photogrammetry in marine ecology *Matteo Collina - Victoria University of Wellington*
1.30pm-1.45pm	Avifauna roosting and nesting at New Zealand's busiest port, Port of Tauranga *Della Bennet - Wildand Consultants*	Artificial Intelligence Annotations Capture Ecological Patterns in SpongeDominated Temperate Mesophotic Ecosystems *Kea Witting - Victoria University of Wellington**
1.45pm-2.00pm	Underwater passive acoustic monitoring of Weddell seal *Leptonychotes weddellii* near tidal cracks around Syowa Station, East Antarctica *Kotaro Ichikawa - Kyoto University*	Identifying deep-sea vulnerable marine ecosystems from still images in the Tasman Sea *Katrina Goddard - Northtec*
2.00pm-2.30pm	**Karakia Whakamutunga | Conference Close**	
2.30pm - 6.00pm	**Free time**	
6.30pm	**Conference Dinner - Bill's Shed - Transport World - buses depart 6.15pm**	

KEYNOTE SPEAKERS

PROF JAMES J BELL

James Bell is a Professor of Marine Biology at Victoria University of Wellington, where he leads a research team focused on subtidal reef ecology. His work spans shallow coastal habitats to mesophotic ecosystems, with a strong emphasis on understanding how anthropogenic stressors influence benthic communities. He is best known for his research on sponges.

His research integrates field surveys, experimental ecology, genomics, and emerging technologies such as photogrammetry and remotely operated vehicles (ROVs) to map and monitor reef biodiversity across Aotearoa New Zealand and internationally.

James is currently supported by a Royal Society Mana Tūārangi Distinguished Researcher Fellowship, multiple Marsden grants, and philanthropic funding. He is actively involved in national and international collaborations with government agencies and regional councils, focusing on classification and mapping frameworks for deep reef habitats. He is a past recipient of the Royal Society of New Zealand Charles Fleming Award.

He has supervised over 50 postgraduate students, with past members of his group now working worldwide as researchers, lecturers, environmental managers, and consultants. He has also led national outreach programmes, developed teaching resources for schools, and featured in documentaries, podcasts, and magazines, as well as giving numerous media interviews.

PRESENTATION: BELOW THE KELP ZONE AND BEFORE THE DEEP SEA: EXPLORING THE MESOPHOTIC COMMUNITIES OF AOTEAROA NEW ZEALAND

WEDNESDAY 1 JULY

Just below the kelp zone, but before reaching the deep sea, lies the mesophotic zone. These unique ecosystems exist at the lower limit of light availability for photosynthesis and typically span depths from 25 to 150 m, although in some light-limited locations, such as Fiordland and parts of Wellington, they occur in much shallower waters. In recent years, the increased availability of small, lower-cost remotely operated vehicles (ROVs) has revolutionised our ability to explore mesophotic ecosystems. Over the past five years, my research group has explored deep rocky reefs within the mesophotic zone across Aotearoa New Zealand and has also worked on shallower mesophotic ecosystems in Fiordland, Wellington, and other parts of the world. Although sponges often dominate temperate mesophotic ecosystems, we have documented a wide range of ecosystem types, including red coral gardens off Fiordland, sponge and anemone forests in Wellington, and ascidian beds off Rakiura/Stewart Island. In this talk, I will discuss my group's work to explore, characterise, and map mesophotic communities across Aotearoa. I will describe our research to understand the ecological function of mesophotic reefs and the role they play in supporting ecologically, culturally and economically important species. I will outline our efforts, working with the Department of Conservation and regional councils, to develop a habitat/biotope classification scheme for mesophotic reefs and apply new photogrammetry approaches to establish ROV-based monitoring programmes. I will also discuss our group's experimental work to understand how dominant mesophotic organisms respond to anthropogenic stressors, particularly the response of sponges to marine heatwaves (MHWs). This will include our recent work to understand the role of symbiotic microbes in supporting sponge acclimation to MHWs and the potential for sponges to survive in changing warmer oceans.

DR JENNI STANLEY

Dr Jenni Stanley is a Senior Lecturer in Marine Science at the University of Waikato and a Rutherford Discovery Fellow. She is a marine ecologist and aquatic acoustician with broad expertise in underwater sound, from the sounds produced by marine animals to the effects of human-made noise on marine ecosystems.

Her research combines soundscape ecology, underwater acoustic analysis, signal processing, sensory ecology, bioacoustics, animal behaviour, and noise pollution. Her current work focuses on the underwater soundscapes of Aotearoa New Zealand's marine protected areas, exploring how much anthropogenic noise occurs within these spaces, which sound-producing species are present, and how human-made noise may alter the acoustic environment. This work supports the development of non-invasive and cost-effective approaches for monitoring and managing marine protected areas.

Jenni works closely with marine managers, regulatory agencies, and conservation professionals to help translate acoustic science into practical environmental management. She has worked internationally, including in the United States as a Research Scientist with NOAA's Northeast Fisheries Science Center and Stellwagen Bank National Marine Sanctuary, and later with Woods Hole Oceanographic Institution.

PRESENTATION: BEYOND THE VISIBLE OCEAN: SOUND AS A MISSING DIMENSION IN MARINE ECOSYSTEM SCIENCE

THURSDAY 2 JULY

Marine ecosystems are often studied through what we can see, sample, map, tag, or model. These approaches have transformed our understanding of the ocean, but they still provide only a partial view. Underwater sound offers another way of observing marine systems: one that captures biological activity, physical processes, and human use as they overlap through time and space.

Sound travels efficiently underwater and is central to the lives of many marine animals, supporting communication, orientation, predator avoidance, habitat selection, and social interactions. For scientists and managers, underwater sound provides a continuous, non-invasive way to observe patterns that are difficult to capture directly. Passive acoustic monitoring can reveal diel and seasonal rhythms, the presence and activity of sound-producing animals, vessel traffic, and changes in acoustic conditions across habitats and management contexts.

In this talk, I will explore what underwater listening can add to the way we understand, monitor, and manage marine ecosystems. I will draw on examples from my Rutherford Discovery Fellowship research, with a particular focus on Fiordland work undertaken in collaboration with the Department of Conservation and Environment Southland. These examples show how soundscapes can complement biodiversity monitoring by revealing biological activity, environmental variability, and human activity in dynamic coastal environments. I will also consider how acoustic approaches may support marine management in places where conservation values, cultural values, tourism, fisheries, vessel activity, and climate pressures intersect.

As marine science responds to growing ecological change and increasing demands on ocean space, listening underwater provides a complementary tool for understanding the systems we seek to protect. To look beyond the visible ocean, we also need to listen.

DI TRACEY

2025 NZMSS AWARD - MATAI MŌANA - WINNER

Di Tracey is a deep-sea Emerita scientist at Earth Sciences NZ with a long career in fisheries and coral research. She has focussed on the biology of deepwater fishes such as orange roughy, spending a lot of time at sea on trawl surveys to collect data and biomass estimates for use in fisheries stock assessments. Di has been instrumental in coordinating and advocating for deep-sea coral research in Aotearoa New Zealand, leading and contributing to research publications on their taxonomy, identification and distribution, age and growth, life-history traits, and threats. Her efforts have greatly increased awareness and understanding of deep-sea coral biodiversity; as such, Di is a recognised international expert on deep-sea corals.

Di has a strong history of advocacy for and mentoring of women working in science during her 40+ year career. She has been a willing and strong mentor for women researchers, has hosted numerous national and international students in the lab and at sea, and supervised several PhD and Masters students. She was awarded a New Zealand Suffrage Centennial Medal in 1993, was the recipient of the Miriam Dell Award for Excellence in Science Mentoring, and is the 2026 NZ Marine Sciences Society Award winner.

PRESENTATION: DECADES IN THE DEEPSEA - CAREER REFLECTIONS

FRIDAY 3 JULY

It is a real privilege to give a keynote to this community, as was receiving the Mātai Moana award in 2025. My keynote address is a great opportunity to reflect on my forty years plus career in Marine Science in Aotearoa. There have been many changes in my field over the decades - along with several highlights, some significant milestones, chat's with Government Ministers, and let's not forget gender equity. My career began in the 1970's with research on snapper and tarakihi, studying parasites to help define stocks, I dived for work, and I even worked in this rohe tagging bluff oysters! Once the Exclusive Economic Zone had been declared in 1982, I moved into the deep-sea space. 'Thinking deep', I participated on or led several fisheries research surveys to help measure the biomass of key commercial species and collect biological data on fish size, spawning, feeding, and age and growth. I will describe the application of improved radio-isotope methods to validate the ages of my 'very political' study species, both of orange roughy and, once we moved into exploring the rich diversity of our deep sea, of various coral groups. The slow growth rates we have measured for corals have provided key data to evaluate risk from commercial fisheries, and the high longevity measured for both orange roughy and corals, has certainly highlighted the need for considering long-term anthropogenic impacts.

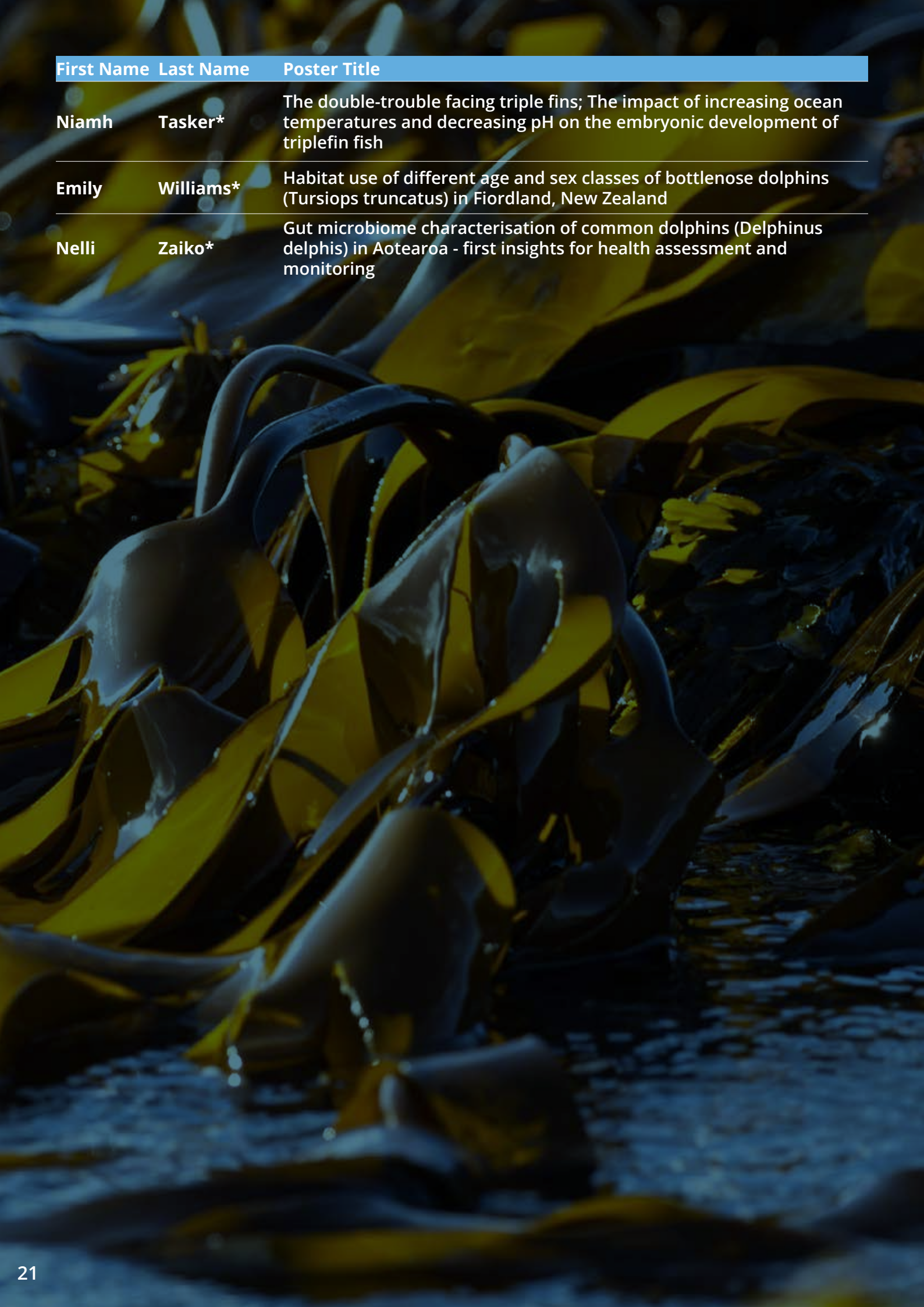
I will emphasise the importance of regular and routine data collection and on-going monitoring of marine fauna; the continuation of support of taxonomy to identify our deep-sea discoveries and to aid those who educate, conserve and manage our marine realm. Finally, I shall emphasise the need for a paradigm shift to measure success in the workplace and to bridge gaps.

POSTER LIST

POSTER SESSION

First Name	Last Name	Poster Title
Henry	Allard	Three Years of the C-SIG Coastal Taxonomic Resource Tool – A shared knowledge base for coastal macroinvertebrate surveys
Gesica Emilee	Aroca Benjamin	Restocking with aquaculture-sourced mussels for benthic restoration under participatory co-management: the case of Choromytilus chorus in Chile
Erin	Bell	The effect of pellet hydration on the performance of juvenile Chinook salmon (Oncorhynchus tshawytscha) feeds
Lucy	Campbell*	Determining the relative roles of temperature and light in the mass bleaching event of sponge Cymbastela lamellata during marine heatwaves.
Katie	Cook	Climate change risk assessment of significant coastal marine habitats around the Wellington Region
Liv	Cornelissen*	The influence of the Drygalski Ice Tongue and Ice Shelf Water on ocean processes in Terra Nova Bay
Josie	Crawshaw	Improving How We Share Water Quality Information: Interactive Dashboards for Freshwater and Coastal Monitoring
Oonagh	Daly	Growing the Next Generation of Marine Detectives
Greer	Gilmer	Developing sediment core chronologies to quantify accumulation rates and organic carbon burial in Fiordland marine basins
Caitlin	Grosvenor*	From canopy to current: tracking the journey and chemical evolution of kelp detritus
Kentaro	Kawai	Initial insights into under-ice fish assemblages near Adélie penguin breeding colonies from eDNA metabarcoding in Lützow-Holm Bay, East Antarctica
Mia	Langley*	Anthropogenic impacts on the reproduction of the southern rock lobster (Jasus edwardsii)
Eva	Leunissen	Comparing abundance and presence-absence models of fish species: ecological factors underpinning their accuracy and validity
Usangi	Maldeniya*	The role of temperate sponge-associated microbiomes in enhancing sponge holobiont acclimation to marine heatwaves
Seamus	O'Mahony	Artificial habitat creation on hard armouring structures
Abigail	Parker*	Spatiotemporal variation in the distribution of Hector's dolphin (Cephalorhynchus hectori) nursery groups at Banks Peninsula, New Zealand
Stephanie	Shaw*	Subtidal Seagrass Mapping in Bluff Harbour: a survey of current distribution and depth extent of the seagrass Zostera muelleri.
Aidan	Stockley*	Mapping benthic habitats on a fringing reef in the Solomon Islands

First Name	Last Name	Poster Title
Niamh	Tasker*	The double-trouble facing triple fins; The impact of increasing ocean temperatures and decreasing pH on the embryonic development of triplefin fish
Emily	Williams*	Habitat use of different age and sex classes of bottlenose dolphins (Tursiops truncatus) in Fiordland, New Zealand
Nelli	Zaiko*	Gut microbiome characterisation of common dolphins (Delphinus delphis) in Aotearoa - first insights for health assessment and monitoring



ORAL ABSTRACTS

Abstracts are ordered alphabetically

Sediment as a driver of benthic community structure in Temperate Mesophotic Reefs of Aotearoa New Zealand

Ahlman Y[1], Bell J[1], Rogers A[1]

[1]Victoria University Of Wellington

Temperate mesophotic ecosystems (TMEs; ~30–150 m depth) form extensive reef habitats throughout Aotearoa New Zealand but remain poorly studied compared with shallow coastal reefs. These deeper reefs are commonly dominated by habitat-forming invertebrates that contribute to biodiversity and ecosystem structure. Many regions experience sediment disturbance from bottom-contact fishing, natural resuspension, and terrestrial inputs, yet the community-level ecological consequences of sedimentation in mesophotic environments remain largely unknown.

Using annotated remotely operated vehicle (ROV) imagery from multiple regions, this study quantifies benthic assemblages and examines how community composition varies across gradients of settled sediment cover. We are using multivariate community analyses to assess patterns of community change associated with sediment exposure. Early analyses indicate that sediment is associated with differences in benthic community composition.

This research provides a regional-scale assessment of sediment influences on temperate mesophotic benthic communities and contributes baseline ecological understanding to support future monitoring and management of deeper reef habitats in New Zealand waters.

Improving the bioreceptivity of artificial substrates: Role of marine biofilms on bio-enhanced concretes with calcium carbonate from mussel shell powder

Ávila-Guerrero P[1,2], Lagos N[2], Benjamin E[3], Johnston L[3,4]

[1]Doctorado en Conservación y Gestión de la Biodiversidad, Facultad de Ciencias, Universidad Santo Tomás, [2]Centro de Investigación e Innovación para el Cambio Climático, Facultad de Ciencias, Universidad Santo Tomás, [3]Institute of Marine Science, University of Auckland, [4]Earth Sciences New Zealand

Developing sustainable coastal infrastructure may require eco-friendly materials like seashells, which can act as cementitious additives to promote marine bio-receptivity. During this process, marine biofilms serve as critical ecological mediators that condition the surface for early colonization. This study compares the successional patterns on artificial substrates (traditional and bio-enhanced concrete with 5% mussel shell-powder) and natural rocky substrates exposed for two months in Quintay, Chile and Aotearoa New Zealand. Sequencing (16S/18S) from the Chile experiment revealed divergent trajectories: while natural rock facilitated the establishment of macroalgal communities toward the end of the study, bio-enhanced concretes remained dominated by highly diverse transitional assemblages with a proliferation of diatoms (e.g., Achnanthes spp.). This biological dominance was chemically consistent with complementary tank exposure tests; FTIR-ATR analysis confirmed that early biofilms on bio-enhanced surfaces exhibited significantly higher protein and extracellular polymeric substance (EPS) concentrations within 24 days. These findings from Chile establish strong expectations for ongoing Aotearoa New Zealand trials using green-lipped mussel, Perna canaliculus carbonate. Overall, incorporating seashells into concrete matrices effectively modulates early biofilm development, providing a basis for the design of bio-receptive materials in coastal environments.

Our Blue Economic future is at risk

Battershill C[1], Thorel F[2], Orchard S[3], Ohia R[4], Gemmill N[5], Wing S[6], Schiel D[7]

[1]University Of Waikato, [2]University of Waikato and Earth Sciences, [3]University of Canterbury and Waterlink, [4]Ngati Pukenga, [5]University of Otago, [6]University of Otago, [7]University of Canterbury

The Natural Capital, Asset Value, and Ecosystem Services of our marine estate is substantial at 3% of GDP, totalling NZ$7.4 billion (NZIER 2024). However, it's future is uncertain because of immediate and growing climate and anthropogenically related impacts. The world's coastal zone, and especially around Aotearoa New Zealand, faces mounting, interacting biophysical stressors. Sea-level rise, ocean acidification, marine heatwaves, more frequent and intense storms, pollution and—arguably most damaging—sedimentation and consequent poor water column light quality, are pushing coastal ecosystems to the brink of functionality. In Aotearoa New Zealand, the status quo for managing rocky reefs is particularly untenable. When intact, these reefs are among the earth's most productive habitats, turning light into carbon, drawing down CO^2, and underpinning marine food webs and the wider ecosystem. Many rocky reef habitats are rapidly degrading, as turbid waters starve them of adequate light for photosynthesis, and fine sediments smother the benthos. Examining effects of Cyclone Bola in (1988) and the recent Cyclone Gabrielle (2023) as prime examples of massive whole-of-region sedimentation events affecting the coastal environment, we will detail the science that examines thresholds for resilience, or otherwise, of kelp and mesophotic reef communities.

Photic - mesophotic transitions show shallowing of kelp forests in response to sedimentation

Leigh Tait[1], Chris Battershill[2], David Schiel[3]
[1]Earth Sciences NZ, Christchurch, [2]University of Waikato, Tauranga, [3]University of Canterbury, Christchurch

Kelp forests are increasingly threatened at a global scale. Exposure to extreme events like marine heat-waves is leading to significant loss of kelp forests in shallow water. While deeper refugia are hypothesized to exist, very few studies have actively assessed the vertical extent of habitat forming kelp. Furthermore, deep refugia may be compromised by additional stressors, with suspended sediments threatening the photic window for kelp. Here we examine transitions of benthic communities across photic and mesophotic zones across gradients of exposure to suspended sediments. Our results showed a dramatic decline in the depth distribution of Ecklonia radiata across gradients of suspended sediments. Ecklonia radiata had an observed depth range over 20 m greater at the clearest site compared to the most sedimented site. Overall community composition shifted across gradients of suspended sediments, with impacted sites showing higher species turnover (beta diversity). Diversity metrics showed marginal trends with variability in clarity but increased with depth. There was, however, elevated species turnover (e.g., beta diversity) under conditions of elevated turbidity. Our results indicate that deep kelp refugia are only habitable under high water clarity. Challenges in light harvesting under conditions of elevated sediments threaten to reduce the spatial distribution of habitat-forming kelps with significant implications for carbon fixation and the services provided by kelp forests.

Utilisation of Insect Meals in Australasian Snapper (Chrysophrys auratus) and Chinook Salmon (Oncorhynchus tshawytscha) Aquafeeds Produced in New Zealand

Magnoni L[1], Bell E[1], Moran D[1], Nicholson G[3], Mahmoud A[2], Liu Z[2], Fabisik F[2], Tapsuri C[2], Jerez N[2], Symonds J[3], Fletcher K[2]

[1]Bioeconomy Science Institute - Seafood Production, [2]Bioeconomy Science Institute - Food and Bioproducts Technology, [3]Cawthron Institute

Aquaculture needs new, sustainable protein sources for aquafeeds, and insects grown on waste streams are emerging as a viable, low carbon protein ingredient. We produced high protein meals from larvae of black soldier flies (Hermetia illucens) and yellow mealworm beetle (Tenebrio molitor). The insect meals were incorporated into formulated diets for Australasian snapper and Chinook salmon to help define recommended insect meal inclusion levels for these species. A 23-day snapper trial (500 g body weight, BW) to test palatability found similar feed intake (FI) levels for diets that replaced chicken meal with defatted black soldier fly larvae meal (BSFLM). Two salmon trials were also undertaken. A 30-day trial (95 g BW) compared commercial, reference, defatted 25% BSFLM or mealworm meal diets. Salmon fed insect meals performed similarly to the commercial diet in FI, specific growth rate (SGR), and feed conversion ratio (FCR), while performance was lower on the reference diet. A parallel 60-day trial (67 g BW) evaluated defatted 16% BSFLM on fish performance. SGR was similar between commercial and reference diets but lower for the BSFLM diet. FI was highest in the commercial diet, while the reference diet generated the best FCR and the BSFLM diet the poorest FCR.

Community responses to restored small-scale oyster, Ostrea chilensis, habitats deployed onto mussel shells in southern Chile

Benjamin E[1], Riquelme R[2], Aroca G[2], Lagos N[3], Jeffs A[1], Ávila M[2]

[1]Institute of Marine Science, The University Of Auckland, [2]Centro Acuícola y Pesquero de Investigación Aplicada (CAPIA), Facultad de Recursos Naturales y Medicina Veterinaria, Universidad Santo Tomás, [3]Centro de Investigación e Innovación para el Cambio Climático, Facultad de Ciencias, Universidad Santo Tomás

Reef-building bivalves have been decimated globally, largely through overharvesting, causing cascading ecosystem effects. Their loss reduces habitat complexity, leading to declines in biodiversity, and ultimately lowering ecosystem resilience and recovery. Chile and Aotearoa New Zealand are uniquely placed to work together to restore the oyster, Ostrea chilensis, a species overexploited in both countries. In this study, we evaluated methods of translocating this oyster species for restoration. Unlike mussels and their broadcast-spawning oyster relatives, O. chilensis brood their larvae and release competent larvae that are ready to settle onto nearby hard substrate. With this pattern of reproduction in mind, two experimental restoration deployments were undertaken in Ancud Bay, Chile in November and February 2024 consisting of mussel shell material (Mytilus chilensis) from the Chilean aquaculture industry and adult oysters on top to promote habitat formation and juvenile settlement. Benthic communities were assessed using infaunal and epifaunal cores in September 2025 after 10- and 19-months and compared to nearby control seabed areas. Early results show temporal shifts in community composition and contrasting responses between infauna and epifauna. These findings provide insight into the enhancement of benthic habitats using shell material which will help to inform scalable oyster restoration strategies across both countries.

Avifauna roosting and nesting at New Zealand's busiest port, Port of Tauranga

Bennet D[1], Johnstone R[2]

[1]Wildland Consultants Ltd, [2]Port of Tauranga

The Port of Tauranga is New Zealand's largest port, handling the country's imports and exports and accommodating the largest container vessels calling to NZ. Beyond its commercial role, the Port is also the home of numerous shorebirds and seabirds, including a stopover location of kuaka/eastern bar-tailed godwit (Limosa lapponica baueri, At Risk – Declining). Since October 2021, comprehensive surveys have been undertaken across 11 different zones within the Port environment to provide baseline data and gain a deeper understanding of how birds use the site. These surveys include weekly surveys of the sand pile during the breeding season (September–February), fortnightly counts during the non-breeding season (March–August), and monthly surveys of the other zones. Each survey targets all breeding and roosting coastal birds, including kuaka/eastern bar-tailed godwit, tuturiwhatu/New Zealand dotterel (Charadrius obscurus aquilonius, Threatened – Nationally Increasing), tōrea/South Island pied oystercatcher Haematopus finschi, At Risk – Declining), tōrea pango/variable oystercatcher (Haematopus unicolor, At Risk – Recovering), tara/white-fronted tern Sterna striata striata; At Risk – Declining), karuhiruhi/pied shag (Phalacrocorax varius varius, At Risk – Recovering), and all other coastal birds. This presentation will discuss the birds roosting and breeding success within this busy Port environment between October 2021 and March 2026.

Why are marine parasites thriving in our freshwater taonga?

Bennett J[1], Finn L[2]

[1]University of Otago, [2]Hokonui Rūnanga

Kanakana, also known as pīharau, lamprey or Geotria australis, are an elusive and precious taonga, yet parts of what occur in their life cycle remain unknown to us. Kanakana life cycles are extraordinary: they begin in our awa as filter feeders for 3-4 years before migrating to te moana as blood-parasites on large marine animals like whales and sharks. A few years later, the kanakana detach from their hosts and migrate back to the awa for terminal spawning. Remarkably, once kanakana detach in the marine environment, it is thought that they stop feeding completely for the remainder of their lives, up to 36 months! So why are they still stuffed with marine parasites after months of returning to the freshwater environment? And what can these parasites tell us about the hauora/health of the kanakana and our taiao? In this talk, we will share details about our kaupapa about parasites of kanakana from an important mahika kai site (Te Au Nui Pihapiha Kanakana) in the Mataura, Southland, and what their infections tell us about the surrounding environment.

Half a century of community change in the northeastern Pacific Ocean

Bennington S[1,2], Huff D[1,3], Burke B[3], Tweit B[4], Wright C[4], Anderson P[4], Wahl T[4], Mills S[4], Stewart J[1]

[1]Earth Sciences New Zealand, [2]Oregon State University, [3]Northwest Marine Science Center, NOAA, [4]Westport Seabirds

The world is in a state of unprecedented change driven by the intensification of anthropogenic activity. Despite ongoing changes to species' abundance and distribution, records that span management periods or environmental variation are relatively rare. Here, we leverage opportunistic surveys conducted in the northeast Pacific Ocean, to explore trends in marine mammal and seabird communities over the past 54 years. Surveys covered a variety of habitats off the Washington coast, collecting occurrence records for 126 species of marine birds and 23 species of marine mammals, of which 49 and 15 had adequate sightings records (30+) to be included in further analyses. Non-metric multidimensional scaling revealed decadal shifts in community structure. To understand species drivers of these shifts, we reconstructed sightings histories using spatiotemporal generalized additive models. The probability of occurrence increased over time for most species, although declining trends dominated in the 1980s and 2010s, and some species had significant negative trajectories over time. Our results provide evidence of recovery linked to relief from anthropogenic impacts (e.g. harvest, pollution), inadequacies in protection, and climate-driven shifts. These data provide valuable insight into the state of top trophic level communities in the northeastern Pacific and highlight the impact of specific management actions.

When Species Move, Maps Must Too: Dynamic Marine Spatial Planning for Aotearoa New Zealand

Brough T, Leunissen E, Anderson O, Lundquist C, Bennion M

[1]Earth Sciences New Zealand, [2]Earth Sciences New Zealand, [3]Earth Sciences New Zealand, [4]Central Queensland University, [5]Earth Sciences New Zealand

Marine spatial planning (MSP) is widely used to balance biodiversity conservation with resource use, yet most applications rely on static species distributions that ignore temporal variability. This is especially problematic for mobile or migratory taxa, leading to ineffective spatial measures. Here, we incorporate seasonal variability into MSP for demersal fish communities in Aotearoa New Zealand to evaluate dynamic approaches. We developed species distribution models (SDMs) for >170 demersal fish species using long-term fisheries-independent trawl survey data, including presence–absence and abundance (CPUE). Ensemble models generated seasonal spatial predictions (spring, summer, autumn, winter) of abundance, which were used in spatial prioritisation analyses to identify high-priority conservation areas. We compared biodiversity representation within hypothetical protected areas (top 30%) from static versus dynamic approaches. Results show substantial seasonal shifts in priority areas, with static prioritisation failing to consistently capture key habitats. Dynamic approaches improved representation, particularly for species with strong seasonal variability. Although dynamic MSP poses challenges for management, relying on static maps may undermine conservation for mobile species. This approach enables identification of critical habitats through "moving" maps and could support more efficient conservation outcomes.

Spatial assessment of recreational fishing displacement from marine protected areas

Tablada J[1], Bennion M[2], Geange S[1], Duffy C[3], Stephenson F[4], Hartill B[5], Hiddink J[6]

[1]Dept of Conservation, [2]Earth Sciences NZ, [3]Auckland War Memorial Museum, [4]Newcastle University, UK, [5]MPI, Fisheries NZ, [6]Bangor University, UK

The establishment of marine protected areas (MPAs) to achieve healthy and resilient ecosystems is a proven conservation strategy to generate a wide range of ecological and socio-economic benefits. However, the planning and design of MPAs must be well thought out to avoid unintended management consequences. Among the things that practitioners should consider is the potential for fishing effort displaced from MPAs to exacerbate fishing impacts outside of MPAs. Commercial fisheries are generally well studied when analysing and predicting fishing displacement, but recreational fisheries often receive less attention. In this study, we analyse the spatial relationship between recreational fishing effort (estimates of recreational fishing vessel density) and the predicted habitat suitability of the main target fish species for recreational fishers in the Hauraki Gulf in northern New Zealand. A spatial prioritisation software, Zonation, was used to identify areas likely to receive fishing effort displacement due to the establishment of 14 new MPAs that exclude all recreational fishing and almost all commercial fishing. A 'displaced effort index' is provided for each protected area, as well as for the entire area of study, to help identify broad areas that are likely to absorb displaced recreational fishing effort. The index can help inform effectiveness of marine protected areas and identify areas that should be the focus of assessments of localised depletion of fisheries resources due to displaced effort. While the analysis described here is based in the Hauraki Gulf, the methodology can be adapted to different areas and other fisheries.

Hot Fuzz: Climate-Driven Proliferation of Filamentous Red Algae in Urchin-Dominated Reefs

Benton P[1]

[1]University Of Auckland

Climate-driven proliferations of red filamentous algae ("fuzz") are increasingly common on temperate subtidal reefs, particularly in degraded habitats. In northeastern New Zealand, their rising occurrence over the past decade, especially within urchin barrens, coincides with ocean warming. This trend is pronounced at the Poor Knights Islands Marine Reserve, where irruptions of the subtropical sea urchin Centrostephanus rodgersii have contributed to kelp forest collapse. However, the identity of these algae and the mechanisms driving their proliferation remain poorly resolved.

We combined molecular and morphological approaches to identify dominant "fuzz" taxa at the Poor Knights and compared seasonal cover between urchin barrens and removal areas. Molecular analyses showed all samples formed a single clade within Gayliella, most closely related to Gayliella dawsonii (type locality: Brazil). Field surveys revealed significantly greater algal cover in barrens than in removal sites, with peak abundance in summer. Filamentous algal cover increased linearly with C. rodgersii density.

These findings indicate that urchin-dominated states promote fast-growing, ephemeral algae. Continued warming and overgrazing are likely to drive further "fuzz" proliferation and barren expansion. Management actions that support kelp forest recovery and enhance ecosystem resilience will be critical to limiting the persistence of filamentous algal-dominated reef states.

Photo-identification mark-recapture to estimate population parameters and site fidelity of broadnose sevengill sharks (Notorynchus cepedianus) in Dusky Sound, Fiordland.

Bezuidenhout J[1], Lewis R[1], Rayment W[1]

[1]University Of Otago

The broadnose sevengill shark (Notorynchus cepedianus) is a large apex predator in temperate coastal ecosystems, yet its ecology in New Zealand remains poorly understood. Three sampling trips to Dusky Sound, Fiordland, were conducted in June 2025, November 2025, and January 2026. Utilising the unique dorsal spot patterns of sevengill sharks for mark-recapture methods via non-invasive baited remote underwater video systems (BRUVs), preliminary results indicate that sevengill sharks were recorded in 26 of 57 deployments, yielding 77 encounters and 63 identifiable individuals. The majority of individuals (n=53) were observed once, eight twice, and two three times, with five resighted across seasons. All recaptures occurred at the original encounter site, suggesting limited movement between sites in Dusky Sound and indicating seasonal site fidelity. BRUVs combined with stereo-photogrammetry allowed for accurate size-distribution measurements. Across these latter periods, 37 males were measured; all were mature, with a mean total length of 189 ± 3.04 cm (SE). In June 2025, 42% of observed sharks were female, whereas in November 2025 and January 2026, only males were observed. Continued monitoring and development of semi-automated photo-ID using SharkBook will provide data to further refine estimates of population demographics.

First seasonal data on seabird diversity in Foveaux Strait, a New Zealand avian hotspot

Borrowdale F[1], Daudt N[1,2], Rayment W[1], Ellenberg U[1]

[1]Department of Marine Science, University Of Otago, [2]Institute of Oceanography, Universidade Federal do Rio Grande

New Zealand is the undisputed seabird capital of the world, boasting a greater variety of seabird species than any other country. Despite this, there is little knowledge on the spatial ecology of seabird species. In the green energy era, the number of planned offshore industrial developments is increasing, which may have negative impacts in areas of high seabird activity. Foveaux Strait, in the south of the South Island, is one proposed area for the development of the offshore wind and aquaculture industry. This strait is an important area for seabird conservation, where at least 78 seabird species forage, breed, and/or migrate through. To mitigate impacts of proposed offshore industry developments on seabirds, robust data on temporal and spatial habitat use is essential. We are currently quantifying seabirds through at-sea vessel-based surveys throughout the year (July 2025-June 2026). The Stewart Island/Rakiura passenger ferry that is regularly crossing the Foveaux Strait came on aboard as a sponsor allowing us 12+ free ferry rides per month on three consecutive days. Strip-transect surveys were conducted recording all birds observed within the forward 90° area. We quantified species richness, relative distributions, and diel and seasonal patterns of occurrence, abundance, and behaviour.

Hau Moana - Next-generation spatial planning for offshore wind development in New Zealand

Brough T[1], Leduc D[1], Montjoy J[1]

[1]Earth Sciences NZ

Offshore renewable energy is a key component of New Zealand's future blue economy, but uncertainty and limited tools for assessing socio-ecological impacts hinder effective decision making. Hau Moana (ocean wind) is an integrated research programme aimed at de-risking offshore wind development by advancing next-generation marine spatial planning.

We apply the CAPTAIN spatial planning framework, which combines reinforcement learning and generative adversarial networks to optimise spatial models that integrate ecological, economic, and Te Ao Māori perspectives. This enables the identification of development scenarios that balance environmental, sociocultural, and economic objectives. Analyses are supported by environmental and socioeconomic data collection using a diverse range of platforms. Predictive frameworks for assessing individual and cumulative impacts are incorporated, alongside the development of feasible mitigation strategies for taonga species and sensitive habitats.

Focusing on high-interest regions with overlapping marine uses, we co-develop tools and guidance with industry, regulators, and iwi/hapū. By reducing uncertainty, improving coordination, and lowering monitoring costs, this work aims to accelerate offshore wind deployment while safeguarding marine ecosystems. Outputs include open-source spatial planning tools, improved impact assessment workflows, and adaptive management frameworks to support New Zealand's transition to net-zero emissions by 2050 and inform global offshore renewable development

Autonomous Underwater Vehicle for Repeatable Seabed Monitoring

Chang D[1], Xu A[1]

[1]Boxfish Robotics Limited

Marine science, management, and environmental compliance depend on seabed monitoring methods that deliver robust photogrammetry and repeatable surveys. In real-world environments, conventional approaches such as diver surveys, towed camera systems, and tethered Remotely Operated Vehicles (ROVs) often introduce variability in altitude, orientation, and positioning, limiting the comparability of datasets over time.

We demonstrate the feasibility of repeatable harbour seabed monitoring using an Autonomous Underwater Vehicle (AUV) through a deployment of a New Zealand-made Boxfish AUV in the Rangitoto Channel at the Port of Auckland. A pre-defined mission was configured with fixed transect coordinates, target altitude, and operational parameters. The vehicle navigated autonomously to the survey area, acquired continuous seabed video, and was monitored via an Ultra-Short Baseline (USBL) transceiver. Position, orientation, and altitude metadata were synchronised with the video stream to support consistent photogrammetry.

By combining USBL, Doppler Velocity Log (DVL), Real-Time Kinematic (RTK) GPS, and onboard sensors, the AUV maintained stable position, velocity, and altitude under moderate currents. These results demonstrate that AUVs provide an effective and scalable solution for long-term, repeatable harbour seabed monitoring with reduced operator variability and improved data comparability.

Transforming Coastal Monitoring: Integrating eDNA and conventional indicators for estuary health assessment

Clark D[1], Laroche O[1], Pilditch C[2], Ellis J[3], Pochon X[1], Zaiko A[4]

[1]Cawthron Institute, [2]University of Auckland, [3]University of Waikato, [4]Sequench

Effective estuary monitoring underpins environmental management, yet many current approaches struggle to detect early ecological change or disentangle multiple interacting stressors. The Transforming Coastal Monitoring programme was established to evaluate whether environmental DNA (eDNA) metabarcoding can complement conventional monitoring tools to improve the sensitivity, diagnostic power, and applicability of estuary health assessments in Aotearoa New Zealand.

This presentation provides an overview of the programme and presents analyses comparing the performance of multiple biomonitoring markers (bacterial [16S], eukaryotic [18S], microalgal [rbcL], and traditional macrofauna) in detecting key estuarine stressors, including sediment mud content, nutrient enrichment, and metal contamination. Using national datasets spanning diverse estuary types, we assess (i) the ecological sensitivity of each marker to stressor gradients, (ii) their standalone predictive performance, and (iii) their complementarity when integrated within a multi indicator framework. We also identify robust indicator taxa associated with different stressors and explore how eDNA information aligns with, and enhances, conventional monitoring approaches.

Diets of the rugose clubhook squids (Onykia robsoni species complex) in Aotearoa New Zealand

Clough S[1], Sabadel A[1,2], Stevens D[2], Braid H[1], Bury S[2], Delgado J[2], Kerr-Hislop O[2], Bolstad K[1]

[1]Auckland University Of Technology, [2]Earth Sciences New Zealand

Squids are important intermediate consumers in marine ecosystems but are difficult to observe. Complementary methods such as stomach content and stable isotope analysis (SIA) of carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) can reveal both snapshot and longer-term trophic information to help build a more robust picture of their ecological niches. Here, we provide the first dietary information for a deep-sea hooked squid species complex (the smaller Onykia robsoni, and the larger undescribed O. aff. robsoni). We investigate their likely trophic positions across their different life stages through SIA of samples taken from chronological transects across their beak chitin. Gut content analyses of O. robsoni were dominated by six species of fish prey, whilst O. aff. robsoni had primarily consumed six species of cephalopods. However, $\delta^{15}N$ values indicated an overlap in dietary contributions from different prey taxa, suggesting that the two squid species have more generalist diets. Both $\delta^{15}N$ and $\delta^{13}C$ values indicate differences in prey and habitat selection throughout the ontogeny of both squid species. Observed variations in $\delta^{13}C$ suggest that both species migrate to deeper waters as they mature. These findings demonstrate that multiple, complementary methods can provide insight into the dietary niches of deep-sea squid species.

From Macro to Micro: the use of photogrammetry in marine ecology

Collina M[1], Davidson L[1], Rogers A[1], Bell J[1]

[1]Victoria University Of Wellington

Over the past two decades, 3D modelling has fundamentally transformed marine ecology, with photogrammetry emerging as a key tool for habitat mapping and characterisation. However, while large-scale mapping applications have dominated the field, the potential of photogrammetry at novel scales and resolutions remains largely unexplored. In this presentation I will describe novels ways in which photogrammetry can be employed in marine systems using recent examples from our work. I will demonstrate how this technology can be scaled down to capture intricate millimetre-level detail in small organisms such as sponges, adapted to accurately reconstruct the complex three-dimensional architecture of black corals, and automated to generate expansive habitat models. These high-resolution models can also be used to generate data on habitat refuge spaces, providing critical data on habitat complexity to inform predictive ecological models. Together, these advances are supporting a shift in how photogrammetry is being applied to marine science questions. Beyond research, these 3D models also unlock powerful opportunities for public engagement. By bringing underwater ecosystems to life through immersive VR experiences, they offer coastal communities and broader audiences an entirely new perspective on ocean conservation and the urgency of protecting marine biodiversity.

Characterizing the spatial movement of restored green-lipped mussel (Perna canaliculus) and shell reefs using Structure-from-Motion photogrammetry

Combs I[1,2], Olsen L[2], Hillman J[1], Pilditch C[1], Benjamin E[1]

[1]University Of Auckland, [2]Earth Sciences New Zealand

Bivalve shell material is used in a wide variety of coastal applications, from promoting recruitment, to pH buffering, to shoreline protection. In Aotearoa, shell is being used to support the restoration of green-lipped mussels (Perna canaliculus), an important species that has experienced widespread declines from extensive dredging. Mussel shell is also being used to promote biodiversity and enhance habitat on degraded seabeds with future applications to explore the effect on sediment dynamics and seabed armoring. In this study, we assessed the changes within the first 6 months of translocated live mussels onto shell material using Structure-from-Motion (SfM) photogrammetry. Three plots were deployed into Pelorus Sound located in the Marlborough Sounds in October 2025. Plots were imaged pre-deployment (just shell beds), immediately, and 6-months post-deployment. Images underwent a SfM product generation pipeline to create 2D orthomosaics and 3D dense point clouds. Using the products, we assessed mussel and shell spatial movement, including the ability of mussels to self-organize, seastar predation densities, and other metrics to characterize deployment dynamics. This work will assess the short-term changes in mussel bed dynamics with the goal of introducing a richer dataset to provide new insights and help inform future restoration decisions.

Increased stratification intensifies surface marine heatwaves north- east of Aotearoa New Zealand in New Zealand's Earth System model

Cornelissen L[1,2,3], Behrens E[2], fernandez D[2], Sutton P[2]

[1]University Of Otago, [2]Earth Sciences NZ, [3]University of Auckland

The Western Boundary Current system in the South Pacific is an important element of the climate system as it carries heat from the tropical regions poleward. The East Auckland Current (EAUC) flows along the continental shelf break of Aotearoa New Zealand's North Island, transporting heat into this region. Sea surface temperatures (SSTs) increase ~0.15–0.2°C per decade in this region, just above the global average, and marine heatwaves (MHWs) are projected to intensify despite a predicted decline in oceanic volume transport.

This study investigates the possible drivers of extreme oceanic warming in low (SSP1–2.6), medium (SSP2–4.5), and high (SSP3–7.0) emission scenarios using New Zealand's Earth System model. Our projections suggest a mean decline of heat transport in the EAUC of 5.3% in SSP1–2.6, 22% in SSP2–4.5, and 46% in SSP3–7.0. Although net heat transport (top 1000 m) is projected to decline, heat near the surface intensifies. This leads to increased stratification and shallower mixed layers by 5 m, 15 m, and 30 m, respectively.

Increased stratification contributes to SST warming of ~2°C to 4°C across scenarios. Despite declining heat transport, MHWs are projected to intensify due to sustained surface warming and reduced wind-induced vertical mixing.

Restoring Flow, Restoring Function: Ecological Outcomes of the Kaituna River Rediversion to Maketū Estuary

Crawshaw J[1], Bell C[1], Hamil K[2]

[1]Bay of Plenty Regional Council, [2]River Lake Ltd

In 2020, freshwater flows from the Kaituna River were restored to Maketū Estuary to enhance estuarine ecological function and support cultural and environmental values following more than six decades of flow diversion. This presentation synthesises up to five years of post diversion consent monitoring to assess estuarine and nearshore ecological responses. Monitoring focused on water quality, sediments, benthic invertebrate communities, and habitat condition. Rapid and system wide changes were observed, including a substantial reduction in nuisance macroalgae, improved sediment oxygenation in the upper estuary, re establishment of fringing wetlands, and recovery of seagrass habitat. Increased freshwater inputs have reduced salinity and altered nutrient regimes, with nitrate concentrations increasing in the mid estuary while dissolved phosphorus and ammoniacal nitrogen declined in upper reaches, consistent with reduced anoxic sediment processes. Microbial indicators in water and shellfish have increased in some lower estuary locations, although responses are spatially variable and influenced by rainfall and catchment inputs. Ecological responses reflect both direct hydrological restoration effects and broader catchment drivers, but overall trends indicate progressive ecological recovery consistent with modelling predictions. Adaptive management continues through catchment contaminant reduction initiatives, flow management during high rainfall events, and ongoing dune spit and estuarine habitat restoration.

Ecosystem Approaches to Fisheries Management on Inshore Reefs

Davis J[1]

[1]Fisheries New Zealand

Ecosystem based fisheries management is multifaceted and the steps to achieve it are not straightforward. While there is no formal roadmap towards EBFM, real issues affecting our fisheries provide learnings that can be used to make progress. Large brown algae, critical to multiple life stages of NZ's most valuable fisheries, has experienced die-offs on inshore coastal reefs around the country. In some regions kelp loss is related to overgrazing by sea urchins, while in other areas the die-offs are periodic and align with marine heatwave events or the impacts of sedimentation. FNZ has progressed research to support management measures to address kelp loss in cases where fishing is known to be a factor, and is investing in better ways of monitoring kelp bed health in areas where environmental factors appear to be dominant. The process behind these initiatives has provided important learnings about the steps required to incorporate ecosystem considerations into fisheries decision-making.

Rapid Reef Recovery Following Removal of Long-Spined Urchins (Centrostephanus rodgersii) in Northeastern New Zealand

Dickson T[1], Balemi C[1], Spyksma A[1], Miller K[1], Shears N[1]

[1]University Of Auckland

As oceans warm, the ranges of many marine species are shifting, with profound ecological consequences. The subtropical sea urchin Centrostephanus rodgersii is a well-known range-extender that has devastated kelp forests in Tasmania, creating urchin barrens by overgrazing reefs in high densities. Over the past 25 years, C. rodgersii populations have irrupted across northeastern New Zealand, with barrens now widespread, including inside marine reserves such as the Poor Knights Islands. Given the lack of likely predators and ongoing warming, novel management interventions are needed. In 2023, we collaborated with the Department of Conservation and Te Whānau a Rangiwhakaahu to conduct experimental removals of C. rodgersii at the Poor Knights Islands. Following removals, kelp and diverse understory assemblages rapidly re-established. Two years post removal, mean kelp cover increased from 7.5% to 69.0%. Shannon diversity increased at all removal sites, while declining at all control sites. These results demonstrate that barrens can recover with reduced grazing pressure, though replicability at larger scales remains uncertain. Our findings provide the first experimental evidence that targeted removals of C. rodgersii can facilitate kelp forest recovery in New Zealand, highlighting both the promise and logistical challenges of scaling up interventions to address threats from climate-driven range shifts.

Long-term patterns and methodological constraints in coastal water quality trends: Evidence from Tāmaki Makaurau (Auckland)

Dikareva N[1], Kamke J[2]

[1]Auckland Council, [2]Pattle Delamore Partners Ltd

Monthly monitoring of physical and chemical parameters at 32 coastal and estuarine sites across Auckland provides a basis for assessing spatial patterns and temporal trends in water quality. State assessments using a coastal water quality index indicate that open coast and outer estuarine sites, characterised by stronger marine influence, exhibit higher water quality, whereas upper estuarine sites near freshwater sources show poorer conditions. Region-wide analysis suggests improving trends in several parameters, including nutrients, turbidity, total suspended solids, and chlorophyll a. However, these trends were restricted to a seven-year period (2017 to 2024) because of shifts in laboratory methods, which introduced systematic differences in some nutrient and water clarity measurements. Shorter-term trends generally show increased sensitivity to climatic variability. Comparisons across 7-, 10-, and 15-year periods for field-measured parameters yielded inconsistent results: pH and temperature trends shifted from decreasing (7-year) to increasing (10–15-year), while dissolved oxygen trends reversed from increasing to decreasing at most sites. Extreme rainfall events in 2023 likely further influenced recent trends. Overall, these findings highlight ongoing local challenges, signs of improvement, and key limitations in detecting trend direction, underscoring the need for paired analytical approaches, exploration of alternative trend analysis methods, and longer, more methodologically consistent datasets.

Intertidal heatwave effects on shellfish and greenhouse gas fluxes

Douglas E[1], Lam-Gordillo O[1], Hailes S[1], Cummings V, Lohrer D[1]

[1]Earth Sciences New Zealand

Estuaries experience tidal and daily variability in both atmospheric and seawater temperatures. This makes shallow estuary ecosystems vulnerable to the effects of climate change, particularly heatwaves. Little is known about the role of intertidal soft sediment ecosystems in the carbon cycle and the influence of atmospheric heatwaves on these ecosystems. We present results of an in-situ heatwave simulation experiment conducted in a pristine estuarine sandflat in the north island of New Zealand. Our previous work has shown that heatwaves can change the greenhouse gas (GHG) source/sink status of intertidal flats dependent on estuary degradation state. This experiment was designed to investigate the influence of atmospheric heatwave conditions on low tide GHG (methane and carbon dioxide) fluxes from a cockle bed. We also present the influence of heatwaves on the benthic community, particularly biodiversity and large bioturbating shellfish, and the indirect effects these have on GHG fluxes. We make inferences about climate change vulnerability of intertidal soft sediment ecosystems, the implications for GHG emissions from pristine marine environments and potential for accelerated climate feedbacks.

Developing an evidence-based decision support tool for marine ecosystems in Aotearoa New Zealand: A matrix approach

Douglas E[1], Burns M[2], Lohrer D[1], Lundquist C[3,1], Geange S[4]

[1]Earth Sciences New Zealand, [2]Environment Canterbury, [3]CQ University, [4]Department of Conservation

Coastal and marine ecosystems are constantly subjected to human-induced pressures from a variety of activities and developments. The mechanisms through which human activities impact the marine environment, and the options available to manage those activities, are poorly understood. The Department of Conservation (DOC) is developing a suite of three interlinked matrices (an Activity–Pressure matrix; a Pressure–Biodiversity matrix; and a Management–Activity matrix) designed to strengthen national capability to understand, assess, and manage the impacts of human activities on marine biodiversity. When used together, the matrices are intended to create an integrated decision-support system that can substantially improve conservation outcomes in Aotearoa's marine environment. Decision-makers will be able to trace pathways from an activity to its pressures, identify which biodiversity components are affected, and determine which management responses are available. This supports clearer, more defensible decisions about where and how activities should occur in evidence-based marine spatial planning processes. Here we present the steps involved in the development of the matrices and the potential applications of the final interlinked matrices as an integrated decision support tool.

Marine heatwave impacts in the seabird capital of the world: how are our seabirds responding?

Dunphy B[1], Taylor G[2], Pleiss I[1], Brown I[1], Della Penna A[1], Whitehead E[1]

[1]Waipapa Taumata Rau/The University Of Auckland, [2]Department of Conservation

We argue that seabirds are the "check engine" light of the marine environment. Sitting atop marine food webs they reflect any oceanic perturbations on local to trans-equatorial scales. Marine heatwaves (MHW's) represent an increasingly important perturbation, but their impacts on seabird taxa in Aotearoa are not well described.

For the past decade we have been mapping the effect of increasing MHW's across multiple petrel and shearwater species breeding within the waters of Tāmaki Makaurau/Auckland. In years where anomalies in sea surface temperature are 1.5-2.0 °C, four of the species we are monitoring were lighter in weight, foraged more extensively, initiated breeding later, and had to rear chicks for longer so that they could fledge. Physiological shifts included increased haemoglobin content and red blood cell volumes, which indicate higher energetic loads on breeding individuals. Collectively these responses imply that food is either harder to find, of lower quality, or a combination of the two. This can result in reduced breeding success for certain species in years with MHW conditions. Particularly concerning is that we recorded strain in breeding adults, the fittest individuals within the population. Thus, the true consequences of MHW's might be greater for non-breeding birds of poorer condition.

The Tawaki Project – Studying New Zealand's elusive "jungle penguin"

Ellenberg U[1,2,3], Mattern T[2,3,4], Houston D[2,5], Long R[6], White J[7], Hornblow B[1,2,8], Stoneman F[1], Otis M[4,9], Seed R[2], Faris A[2], Pütz K[10], Garcia Borboroglu P[3,11]

[1]Department of Marine Science, University of Otago, [2]The Tawaki Project/Tawaki Trust, [3]Global Penguin Society, [4]Department of Zoology, University of Otago, [5]Department of Conservation, [6]West Coast Penguin Trust, [7]Cornell University College of Veterinary Medicine, 8Department of Conservation, 9Wildlife Management International Ltd, [10]Antarctic Research Trust, [11]Centro Nacional Patagónico (CONICET)

New Zealand's "jungle penguin", the enigmatic Fiordland penguin, or tawaki, remains one of the least known penguin species in the world. Eleven years ago, the Tawaki Project set out to study the penguins' distribution, reproductive success, and marine ecology across their breeding range, examining foraging behaviour both during and outside of the breeding season at sites representative of the species' varied marine habitats. During breeding, unique environmental conditions in Fiordland appear to provide a safe haven for tawaki in the face of adverse environmental conditions elsewhere. Their behavioural plasticity and ability to forage in a wide array of habitats may make them more resilient to change. We documented extraordinary long-distance movements during the pre-moult and wintering journeys, exceeding those of any other penguin species. These marathon journeys made us reconsider assumptions about penguin migratory limits and emphasize the importance of protecting the marine environment beyond national boundaries. We will share eleven years of technological challenges and solutions to support conservation on the ground in New Zealand's rugged and inaccessible southwest, reflecting on what worked and what didn't. In the face of significant environmental change, doing things differently may be a key to success - both for the penguins and people.

Investigating the potential of Asparagopsis armata as a candidate for integrated multi-trophic aquaculture (IMTA) of seaweeds and mussels in Aotearoa New Zealand

Feary T[1,2], Biancacci C[2], Dunphy B[3], Maresse S[2], South P[2], Zamora L[1,2]

[1]Institute of Marine Science, University of Auckland, [2]Cawthron Institute of Science, [3]School of Biological Sciences, University of Auckland

Integrated multi-trophic aquaculture (IMTA) is heralded as an alternative, more efficient and sustainable approach to marine farming than traditional single-species aquaculture. IMTA is based on the principle that farming species from different trophic levels together in one system allows waste and effluents from higher-trophic species to serve as nutrients for lower-trophic organisms. Seaweeds are often proposed as important components of IMTA systems although relatively few studies have assessed their performance when cultured with mussels. A six-week, land-based trial with tetrasporophytes of the native rhodophyte Asparagopsis armata growing in exposure to effluent from four different biomass treatments of green-lipped mussels (Perna canaliculus) was set up to investigate this. Results showed an increase of 108% in the total biomass of A. armata when grown in seawater exposed to high mussel effluent, compared to our control treatments, and increases of 51% and 53% for our low and medium mussel biomass effluent treatments respectively. We quantified growth rates, proximate compositions, nitrogen and carbon content, and stable isotope ratios of the seaweed and found responses to variations in mussel effluent nutrient concentrations. We discuss these findings in the context of implementing IMTA alongside green-lipped mussel aquaculture in Aotearoa-New Zealand.

Environmental magnetism as a redox proxy, Patea/Doubtful Sound, Fiordland, New Zealand: implications for carbon sequestration

French A[1], Nelson F[1], Gilmer G[2], Riesselman C[1], Moy C[1]

[1]Geology Department, The University Of Otago, Ōtākou Whakaihu Waka, [2]Earth Sciences New Zealand

Deep fjord basins in Fiordland accumulate and preserve substantial volumes of organic-rich sediment, making them important carbon sinks within Aotearoa New Zealand's coastal system. Environmental magnetic proxies provide an efficient, non-destructive way to track changes in magnetic mineralogy, concentration, and grain-size, offering insight into how redox conditions and surrounding environmental processes evolved through time.

Here we present highly resolved down-core environmental magnetic records from a ~8.4 m sediment core (SO309-GeoB-26347-1) collected in Patea/Doubtful Sound, Fiordland, New Zealand. A basal radiocarbon age indicates the core spans the last ~5000 years.

Alternating Field demagnetisation indicates that magnetite (Fe3O4) is the dominant magnetic mineral down-core; however, at least seven distinct intervals of gyroremanent magnetisation indicate greigite (Fe3S4), the sulfur analog of magnetite, which forms under euxinic (anoxic and sulfidic) conditions favourable to carbon sequestration. Paleomagnetic inclination varies around the expected Geocentric Axial Dipole inclination in the top 6.5 metres of the core, suggesting largely syndepositional greigite deposition/formation and rapid water chemistry transitions.

These results will be placed in the broader context of Holocene environmental change to assess the likely drivers of anoxic water-column and sedimentary conditions within this large fjord sub-basin.

Rafting on plastic: marine debris in invasion ecology

Gammon M[1], Fletcher L[1], Steidle L[1], Davidson I[1]

[1]Cawthron Institute

Not only is plastic pollution an environmental eyesore, but it is also a growing concern in invasion ecology, which is the study of how species spread beyond their natural range and the impacts that follow. Invasive species can disrupt ecosystems, outcompete native species, and generate economic and cultural costs.

Pathways of introduction or "vectors", include well-known mechanisms such as ship biofouling, and ballast water, as well as less understood ones like drifting marine debris. A striking example is the dispersal of coastal species across the Pacific following the 2011Japanese tsunami. Plastic trash, now ubiquitous in the environment, can act as a long-lasting raft transporting attached organisms across oceans.

This study reviews global evidence of species transported on marine debris, showing that many organisms can colonise and persist on plastic. Most records occur within native or established ranges, suggesting successful long-distance invasions via debris are relatively rare. With a focus on Aotearoa New Zealand, it also considers historical records of marine debris–associated species, and how hydrodynamic particle-tracking models can simulate regional debris movement. While a less prominent vector overall, plastic debris remains important due to its potential for rare but high-impact events.

Developing a National Evidence Base for High Value Marine Biodiversity

Geange S[1], Rowley O, Tranter S, Delpachitra A, Oliver M

[1]Department Of Conservation

Aotearoa New Zealand holds extensive scientific and planning information on marine areas of ecological significance, developed independently by regional councils to support statutory coastal planning and management. We present a unified national dataset that consolidates council-identified significant marine areas into a single national spatial layer. The unification process harmonises data structure and attributes, preserves traceability to original data sources and planning contexts, and enables consistent national-scale use and comparison.

Building on this unified dataset as a foundation, we are undertaking complementary work to identify and map High-Value Marine Biodiversity Areas (HVMBAs) to augment the unified layer where nationally important biodiversity values are not yet captured or where new evidence is emerging. HVMBAs are defined as areas that make a significant contribution to the long-term persistence of indigenous marine biodiversity and are identified using nine criteria spanning species, habitats, ecosystems, and ecological processes. Identification of HVMBAs has commenced and is ongoing.

Together, the unified dataset and emerging HVMBA mapping are intended to form a living, science-led evidence base to support research, monitoring design, national reporting, spatial planning, and early-stage policy and consenting considerations. We invite researchers, iwi, agencies, and practitioners to contribute data and knowledge to strengthen future HVMBA identification nationwide.

Achieving full representativity of seafloor biodiversity with minimal expansion: exploring a strategy for New Zealand marine conservation

Tablada J, Geange S, Hiddink J, Stephenson F

[1]Department Of Conservation

The New Zealand Seafloor Community Classification (NZSCC) was developed to support national marine spatial planning by describing compositional turnover among 1,716 taxa (demersal and reef fish, benthic invertebrates, and macroalgae) grouped into 75 seafloor community types. Using NZSCC data and the conservation planning software Zonation, we assessed how the representativity of benthic communities could be improved within New Zealand's spatial management areas, including marine protected areas. We combined estimates of within- and between-group similarity and dissimilarity (including uncertainty) with taxonomic richness as indicators of beta and alpha diversity. Two planning scenarios were evaluated: (1) a baseline that ignores existing spatial management measures; and (2) an expansion scenario that optimally adds to the current management network. Both scenarios highlight that modest increases in protection can yield substantial gains in representativity across all NZSCC groups, including groups that are currently unrepresented. Incorporating within- and between-group similarity/dissimilarity improves upon prioritisation approaches that treat mapped community groups as internally uniform. Overall, our findings provide a strong evidence base for designing future protection measures in New Zealand that better meet the representativity component of the Global Biodiversity Framework Target 3.

One Size Does Not Fit All: Setting Biologically Informed Minimum Harvest Sizes for Sustainable Pāua Fisheries

Gerrity S[1, 2], McCowan T[2], Prince J[3], Schiel D[1]

[1]University of Canterbury, [2]Paua Industry Council, [3]Biospherics

The minimum legal size (MLS) for harvest of blackfoot pāua in most of New Zealand has remained at 125 mm, despite being derived from spatially limited data and not accounting for substantial regional variation in growth rates and size at maturity. In faster growing regions, this uniform MLS likely allows pāua to be harvested before they contribute sufficiently to spawning biomass, increasing the risk of recruitment overfishing.

We apply biologically informed spawning potential ratio (SPR) equations to pāua population structure data collected through field surveys to calculate more sustainable, site-specific harvest sizes. This approach provides a practical framework for setting fine scale catch limits to optimise spawning potential and support long term fishery productivity.

We present scenarios where harvest pressure is high and demonstrate how SPR analyses can inform adaptive management and rebuilding strategies for depleted populations. We also examine how shell morphology and the successional stages of pāua shell fouling communities can provide insight into local growth dynamics.

Together, these approaches obviate the limitations of a one size fits all MLS and support the development of a national strategy for implementing biologically grounded, locally tailored harvest settings that enhance the resilience of this iconic and vulnerable fishery.

Identifying deep-sea vulnerable marine ecosystems from still images in the Tasman Sea

Goddard K[1], Goode S[2], Hooper E[3]

[1]Department of Applied and Environmental Sciences, NorthTec (Tai Tokerau Wānanga), [2]Department of Earth, Ocean and Atmospheric Science, Florida State University, [3]Greenpeace Aotearoa

In March 2025, Greenpeace and collaborating scientists undertook a deep-sea expedition in the Tasman Sea, an area that has historically been heavily bottom trawled. More recently, there have been several coral bycatch events, raising concerns about the potential impacts on deep-sea vulnerable marine ecosystems (VMEs).

Accurately mapping and designating VMEs is crucial for informing spatial management and conservation planning. In this region, VME designation has primarily relied on density-based metrics, but such approaches risk underestimating VMEs as they fail to capture other VME characteristics, such as uniqueness or rarity, functional significance, fragility, and life-history traits.

Baco et al. (2023) is an expert-based decision framework to identify VMEs from still images which applies all five FAO Deep-sea VME criteria. We present results applying the Baco et al. approach to two seamount areas open to bottom trawling – Central Lord Howe Rise and Northwest Challenger. Of the 260 still images selected for quantitative analysis, a subset of the high-resolution towed camera footage, 45 to64% were classified as VMEs (respectively).
Our findings show these areas warrant closure to protect identified deep-sea fragile ecosystems, and demonstrates that the Baco et al. approach represents a standardised repeatable transparent process for VME identification from deep-sea imagery.

Sponge holobionts tolerant to 2100 ocean conditions of warming, acidification and deoxygenation

Graham B[1], Bell J[1], Thomas T[2], Cornwall C[1], Davy S[1]

[1]Victoria University Of Wellington, [2]University of New South Wales, Sydney

Steadily increasing atmospheric carbon dioxide concentrations are leading to what has been termed a 'deadly trio' of threats to marine organisms: ocean warming (OW), ocean acidification (OA) and ocean deoxygenation (OD). Most past laboratory studies have focused on the impacts of these stressors individually, ignoring the potential antagonistic or synergistic effects on different taxa. In this study, we ran a simulated multi-driver experiment, with an ecologically relevant design, to explore the interactive effects of IPCC-projected 2100 levels (under SSP5–8.5) of OW, OA and OD on marine sponges and their microbiomes. We included three endemic and ecologically important sponge species from the Fiordland Marine Area, Cymbastela lamellata, Axinella richardsoni and Pararhaphoxya sinclairi. All three species exhibited strong tolerance to this combination of future conditions, with no measurable difference in respiration rates and biomass, 100% survival, and homeostasis in their microbial communities. This collectively suggests maintenance of the holobiont's core functionality. Microbiome analysis revealed in all sponge species a high relative abundance of ammonia-oxidising archaea (order Nitrososphaerales), which can remove toxic ammonia that is known to accumulate under stress due to increased metabolic rates. Our results indicate that these sponges can withstand changes to the ocean's mean state projected for 2100.

Radiographic assessment of bone maturation: A tool for age estimation in common dolphins (Delphinus delphis)

Hanninger E[1], Barratclough A[2], Betty E[1], Anderson M[3], Perrott M[4], Bowler J[5], Palmer E[1], Peters K[6], Stockin K[1]

[1]Cetacean Ecology Research Group, School of Natural Sciences, Massey University, [2]National Marine Mammal Foundation, [3]New Zealand Institute for Advanced Study, Massey University, [4]School of Veterinary Sciences, Massey University, [5]Auckland Radiology Group, [6]Marine Vertebrate Ecology Lab, Environmental Futures, School of Science, University of Wollongong

We present the first radiographic ageing framework for common dolphins (Delphinus delphis), based on ossification patterns in the pectoral flipper. Using individuals of known dental age, we calibrated two modelling approaches to predict age from radiographic bone scores: (1) a univariate polynomial regression using a total bone score (sum of 16 scores across all assessed flipper bones), and (2) a multivariate canonical analysis of principal coordinates (CAP) incorporating 16 individual bone-score variables. Both approaches successfully predicted dental age from skeletal ossification patterns. For an age range of 0 to 24 years, polynomial regression demonstrated high predictive accuracy, with median absolute errors (MAEs) of 1.25 years in females (Spearman's $\rho = 0.93$, $R^2 = 0.90$) and 1.08 years in males ($\rho = 0.95$, $R^2 = 0.86$). The CAP model yielded MAEs of 1.35 years in females ($\rho = 0.90$, $R^2 = 0.85$) and 1.80 years in males ($\rho = 0.94$, $R^2 = 0.84$). Radiographic bone ageing models achieved equal or lower MAEs and higher R^2 than a recently developed epigenetic clock for the same population (MAE = 1.80, $r = 0.91$, $R^2 = 0.82$). Our results demonstrate radiographic ageing as an accurate non-invasive tool for age assessment.

Climate-smart marine spatial planning for biogenic habitat-forming species in Aotearoa New Zealand

Hayden M[1], Bennion M[1], Brough T[2], Leunissen E[2], Pardo E[3], Geange S[3]

[1]Earth Sciences NZ, [2]Earth Sciences NZ, [3]Department of Conservation

Climate-smart marine spatial planning (MSP) is essential for achieving biodiversity protection under rapid environmental change. Aotearoa New Zealand has committed to the Convention of Biological Diversity target of protecting 30% of marine areas by 2030; however, responsibly meeting this target requires strategies that consider future climate effects on biodiversity. Habitat suitability models (HSMs) are used to forecast species distributions by linking occurrence or abundance to environmental drivers, and are increasingly used to identify ecologically important areas.

Earth Sciences NZ developed an expert-informed HSM framework to predict current and future distributions of marine taxa considered vulnerable to climate change. This framework has been applied across multiple biogenic habitat-forming invertebrate and macroalgal taxa. Using these modelled distributions, we 1) identified potential climate refugia, and 2) assessed spatial overlap between existing marine protected areas (MPAs) and priority habitats under present conditions and four future climate scenarios, representing moderate and high emissions pathways for 2050 and 2100.

Results indicate diverse climate responses among taxa, with projected range contractions, shifts, and expansions across groups. We demonstrate how multi-taxa prioritisation can reveal vulnerabilities and opportunities within current MPA networks and discuss their application in climate-smart MSP to mitigate the loss of sensitive habitats under future climates.

Fatal Attraction? Shellfish Aquaculture Creates Significant Recreational Fishing Amenity.

Heaphy A[1], Parsons D[1],[2], Jeffs A[1]

[1]University Of Auckland, [2]Earth Sciences New Zealand

Aquaculture is increasingly being recognized as causing ecological changes in coastal marine environments, influencing wild fish populations through habitat modification and food subsidies. However, effects of aquaculture activities on fisheries are the subject of relatively little quantitative analyses. This is the first study to specifically evaluate the influence non-fed aquaculture habitats have on recreational fisheries. Specifically, we compared total harvest, fishing effort, catch per unit effort (CPUE), and harvested snapper sizes between mussel farm and non-mussel farm areas using data collected by Earth Sciences New Zealand (ESNZ). The results confirm that mussel farms act as significant fishing amenities for recreational fishers. This amenity was most pronounced in the Firth of Thames where over two thirds of total recreational snapper harvest came from within just two mussel farms in 2017. This interaction highlights the need for fisheries management strategies that account for aquaculture structures as drivers of localized fishing pressure which have a substantial contribution to the total harvest of snapper in Northern New Zealand.

Underwater passive acoustic monitoring of Weddell seal (Leptonychotes weddellii) near tidal cracks around Syowa Station, East Antarctica

Ichikawa K[1], Kawai K[2], Kuroda M[3], Nishizawa H[1], Asai S[4], Mitamura H[1], Miyamoto Y[4]

[1]Kyoto University, [2]Hiroshima university, [3]Japan Agency for Marine-Earth Science and Technology, [4]Tokyo University of Marine Science and Technology

Passive acoustic monitoring offers a powerful observation tool for biotic and abiotic processes in the Antarctic region. In particular, Antarctic seals provide an opportunity to examine how large marine animals behaviorally respond to fine-scale sea-ice structure. In January, [2]0[23], three underwater recorders (SoundTraps) were deployed in an equilateral triangle array ([2]00-m baseline distance) in a fast-ice area off Syowa Station. A total of 9[35]9 sounds, i.e. [1]9[5] Weddell seal vocalizations and 9[164] ice cracking sounds, were detected from [2]0[3] hours of recordings. Locations of the seals were estimated by hyperbolic positioning. Spatial overlap analysis showed that 8[2]% of calling locations fell within the distribution range of sea-ice tidal cracks defined by a 99% kernel density estimate. Vocal activity of the seals was associated with tidal crack zones, suggesting that these features function as focal sites for communication and possibly territorial behavior.
Statistical modeling demonstrated that temporal variation in call detection frequency was significantly associated with air temperature, tidal height, and wind speed, indicating that both atmospheric and oceanographic processes influence acoustic behavior. Together, these results show that fine-scale sea-ice dynamics provide an important explanatory framework for understanding seal spatial ecology in polar coastal systems.

From Science to Decisions: Comparing Marine Ecological Impact Assessment in New Zealand and International Contexts

Jones E[1]

[1]SLR Consulting Limited

Marine ecological impact assessment is a critical interface between marine science and decision-making for coastal and offshore development. Approaches to impact assessment are shaped by distinct legislative frameworks, cultural contexts, and expectations for evidence. Drawing on applied project experience in Aotearoa New Zealand, Australia, and international marine developments, this presentation compares how marine ecological impact assessment approaches differ in practice and explores the implications for project outcomes.
In New Zealand, assessment is closely aligned with effects-based legislation and increasingly influenced by mātauranga Māori, resulting in strong emphasis on contextual understanding, significance of effects, and adaptive management. Australian frameworks generally apply more prescriptive guidance, defined thresholds, and structured risk-based methodologies, while international projects often rely on international best-practice standards to guide assessment in data-limited or emerging regulatory environments.
Using practical examples, this presentation compares assessment scoping, baseline data requirements, impact significance determination, and mitigation design, highlighting both convergences and divergences in how marine ecological risks are evaluated and communicated. The presentation concludes by reflecting on lessons relevant to marine science practice in Aotearoa New Zealand, identifying transferable good practice and opportunities to strengthen the role of marine ecology in assessing and managing anthropogenic impacts.

Physiological and microbiome responses of the black coral Antipathella fiordensis to marine heatwaves

Kirk A[1], Davy S[1], Thomas T[2], Bell J[1]

[1]Victoria University Of Wellington, [2]The University of New South Wales

Marine heatwaves (MHWs) are intensifying across Aotearoa New Zealand, with Fiordland experiencing two of its most severe events on record within the past decade. Fiordland supports one of the world's largest black coral populations, with approximately seven million Antipathella fiordensis colonies providing complex habitats for diverse fish, sponge, and invertebrate communities. Although no obvious decline was observed during a recent MHW, these corals were not closely monitored, and their thermal tolerance and susceptibility to future warming remain unknown. We present results from a controlled laboratory experiment exposing juvenile A. fiordensis to a simulated MHW. We assessed visual stress indicators, survival, respiration, and associated microbiome dynamics. Coral physiology did not differ between treatments, indicating short-term resilience to this level of warming. However, ^{16}S rRNA sequencing revealed significant shifts in the microbiome composition under MHW conditions, suggesting sub-lethal disturbances to the coral holobiont. These findings indicate resilience to recent warming events, consistent with field observations. Yet, microbial shifts suggest possible vulnerability or early adaptive response under future warming, with potential consequences for Fiordland's coral-dominated ecosystems. This study provides the first experimental evidence of thermal sensitivity in A. fiordensis and offers important insight for the conservation of Aotearoa's unique cold-water coral ecosystems.

Embedding Vision Mātauranga in Blue Carbon Research: Ōraka-Aparima Engagement in the Fiordland Carbon Sink Research Programme

Kitson J[1,2], Peterson K[2], Edge K[3], Carle E[2], Rata Pryor Rodgers R[1,2], Hodgson B[1], Westenra K[2], Veitch C[1], Nelson F[4], Moy C[4]

[1]Tohu Environmental, [2]Ōraka-Aparima Rūnaka, [3]Edge Effect, [4]Ōtākou Whakaihu Waka/ University of Otago

Fjords are globally significant blue carbon systems, yet their sensitivity to climate change, catchment modification, and altered freshwater inputs remains poorly understood. Fiordland (Te Rua-o-te-Moko), in southern Aotearoa New Zealand, is likely one of the country's largest marine carbon sinks, with important implications for biodiversity, climate regulation, and blue economy decision-making. This presentation focuses on the Ōraka-Aparima Rūnanga Vision Mātauranga (VM) project within the MBIE Endeavour-funded programme Carbon Sequestration in New Zealand's Southern Fjords, highlighting how Indigenous-led engagement is supporting the relevance and application of marine carbon research.

Through hui and wānanga, Ōraka-Aparima Rūnaka, the Kaitiaki for this coastal region, has articulated priorities that include meaningful participation of whānau in marine research, the use of mātauranga Māori alongside biophysical science, and economic analysis. A VM project plan has been developed to guide engagement, communication, and knowledge use, supporting Indigenous participation in complex blue carbon research while upholding kaitiakitanga.

We demonstrate how this VM project supports Indigenous management objectives, strengthens the interface between marine science and governance, and contributes to locally grounded and wider climate resilience pathways. This case study offers insights relevant to international efforts to align blue carbon science with Indigenous stewardship, co-governance, and sustainable marine management.

Variation in estuarine environmental conditions drives divergent metabolic phenotypes in a key benthic bivalve

Lam-Gordillo O[1], Douglas E[1], Petersen G[1], Carter K[1], Hailes S[1], Hattingh R[1], Greenfield B, Lohrer A

[1]Earth Sciences New Zealand

Estuarine ecosystems are increasingly influenced by sediment degradation driven by fine-sediment accumulation and organic matter enrichment, yet the physiological mechanisms underpinning organismal responses to these changes remain poorly resolved. In this study, we compared the metabolic expression of the key macrobenthic bivalve Austrovenus stutchbury between two environmentally contrasting estuaries: one relatively pristine and one heavily degraded. Using an untargeted metabolomics approach, we assessed differences in metabolite composition, abundance, and structure between estuaries. Our findings revealed clear separation of metabolomic profiles between pristine and degraded environments, indicating distinct metabolic phenotypes associated with estuarine condition. We found evidence that further demonstrated that variability in metabolic profiles was significantly associated with sediment properties, particularly mud content and organic matter, linking physiological responses to underlying environmental gradients. Our results also showed that estuarine degradation is associated with coherent reorganisation of bivalve metabolic expression, rather than uniform metabolic suppression, highlighting shifts in energy metabolism and stress-related pathways. These findings provide mechanistic insight into how sediment condition influences bivalve physiology and highlight the value of environmental metabolomics for detecting sublethal responses to habitat degradation. Understanding such physiological responses is critical for predicting the resilience and response of estuarine ecosystems to ongoing anthropogenic pressures.

Shark Spy Rakiura: Extending students with marine research

Lewis R[1], Carson S[1]

[1]University Of Otago

The New Zealand Marine Studies Centre (NZMSC) has supported senior primary and secondary students in their learning via science enrichment and extension programmes for many years. These programmes seek to teach practical science skills and critical thinking through involvement in participatory programmes under the guidance of practicing scientists. In $^{2}0^{25}$ and $^{2}0^{26}$ the NZMSC invited students from Menzies College to participate in a science extension programme on Rakiura with the objective of increasing available sightings data on sharks. The programme is aimed at year $^{1}0$ students, and involves learning how to plan and conduct a research transect, including background learning, formulating an objective, and planning the transect path within the available time and resources. Here, student representatives from the school present their transect data, including environmental parameter measurements and analysis of baited underwater video data. The resulting biodiversity of these transects have additionally been shared via iNaturalist for make the sighting data publicly available. Discussion will also address outcome for students, teachers and scientists and the importance of place-based authentic learning opportunities for growing future marine scientists.

A flexible spatial data framework for estuaries: evaluating ecological risk and restoration potential in a changing world

Lam-Gordillo O[1], Douglas E[1], Petersen G[1], Gladstone-Gallagher R[2], Hewitt J[2], Paul-Burke K[3], Lohrer D[1]

[1]Earth Sciences New Zealand, [2]University of Auckland, [3]University of Waikato

Estuarine ecosystems deliver essential functions and services that support biodiversity and benefit humankind worldwide, yet are subjected to multiple anthropogenic pressures affecting their diversity, functions, and services. Declines in estuarine functioning and health have spurred the development of strategies for better conservation and management. Here we present a novel, flexible spatial data framework that was collaboratively developed (with stakeholders and iwi partners) to inform and improve the management of estuarine ecosystems. We provide a real-world interpretation of twelve theoretical principles addressing ecological interactions and resilience to multiple stressors, and methods for converting the principles into spatial layers for use in management. This flexible spatial data framework can be used to identify at-risk habitats and parts of estuaries, and to identify potential restoration sites. We demonstrate the use of the framework in contrasting case study estuaries in an effort to understand their relative states of degradation and restoration prospects. Findings from the framework aligned with field observations as well as local and indigenous knowledge. The flexibility of the framework enables its application in estuaries across the country, with adjustments made depending on data availability. Our framework presents several opportunities for future development and will provide numerous benefits for managing estuaries.

The breathing seascape: spatial and temporal up-scaling of an estuarine ecosystem function

Lohrer D[1], Stephenson F[2], Lam-Gordillo O[1], MacDonald I[1], Massuger J[3], Paul-Burke K[4],[5], Douglas E[1], Petersen G[1], Bulmer R[6]

[1]Earth Sciences New Zealand, [2]Newcastle University, [3]Australian Institute of Marine Science, [4]University of Waikato, [5]MUSA Environmental, [6]Tidal Research

Primary production is a recognised indicator of ecosystem health, with primary production dynamics used to track environmental change across scales in multiple ecosystem types. Here, we collected empirical data and developed a model to map seafloor primary production at high resolution in a shallow estuary. The model incorporated spatial variability associated with bathymetry and seabed habitat type (mud, sand, and seagrass) and temporal dynamics associated with changes in suspended sediment concentration, seasonal light availability, tidal water depth variation, and daily light-dark cycles. We found that, due to the large extent of shallow areas with high incident sunlight radiation, the benthos contributed oxygen to overlying seawater every day of the year (net autotrophic), with productivity lowest in Winter and highest in Spring. Patches of seagrass were the most productive areas of the estuary, whereas deep channels and muddy seafloor habitats in the inner arms of the estuary (where turbidity was also highest) were the least productive. The seafloor exhibited pulsed rhythms of primary productivity (daily, tidal, and seasonal differences in oxygen production and consumption), resembling a seascape that 'breathes' in and out, aligning with the way the local Indigenous Māori guardians of the estuary conceptualise their natural world.

From Catchment to Coast: Insights from Otago's Blue Edge Review

Madarasz-Smith A[1], Shanahan B[1], Thomas S[2]

[1]PDP, [2]Otago Regional Council

Otago's coastal marine area spans [4]80 km of coastline and supports nationally significant biodiversity, productive fisheries, and high cultural and recreational values. However, it faces increasing and interacting pressures. To inform the update of the Regional Plan: Coast for Otago, we assessed Otago's coastal environment and the Regional Council's priorities through a structured review of existing monitoring programmes, targeted technical reports, and expert knowledge across agencies. Sedimentation arising from land-use change and river management emerged as the dominant pressure. Elevated sediment loads were associated with reduced water clarity, loss of kelp forests and seagrass, degradation of estuarine habitats, and impaired foraging for visual predators.

Here we outline an approach to environmental reporting to support coastal plan development and future monitoring priorities and identify key monitoring gaps and propose indicators to measure the effectiveness of future policies and changes in ecosystem health.

Catchment Management - Working together in partnership for Te Taiao

Melidonis M[1], Barach T[1], Branch M[1], Cook K[1], McClean R[2], O'Mahony S[1], Parai R[3], Sagar A[2], Singh N[1], Smith S[1], Young J[1]

[1]Greater Wellington Regional Council, [2]Te Rūnanga o Toa Rangatira, [3]Kaitiaki Ika

State of the Environment monitoring in Te Awarua o Porirua Harbour demonstrates that despite decades of investment across the catchment, the environmental health of the estuary continues to decline. While terrestrial and freshwater interventions can help reduce fine sediment flowing into the estuary, additional measures are required to support meaningful estuarine recovery. In response to these observations, councils and partners are increasingly adopting non-regulatory, place-based approaches grounded in adaptive catchment management principles.

We share our journey in developing a partnership led framework for collaborative initiatives designed to halt and reverse estuarine degradation, centred around Te Wai Ora o Parirua (The Porirua Harbour Accord) - a formal commitment between five agencies to restore the health and mauri of the Porirua Harbour Catchment. The co-designed outcomes framework has been used to prioritise a focused set of high impact, feasible actions for inclusion in an implementable Harbour Action Plan.

The work highlights the critical role of coordinated governance, communications, and community engagement in operationalising ki uta ki tai management. Emerging insights demonstrate how alignment across agencies, integration with long-term planning processes, and shared storytelling can strengthen collective action and improve environmental outcomes for estuaries facing compounding pressures.

Do Internal Waves Cool Reefs? Insights from Tawhiti Rahi/ Poor Knights Islands

Melzer H[1], Smith R[1], Stevens C[2,3], Collins C[2], Macdonald H[4], Rogers A[5], Behrens E[2]

[1]University Of Otago, [2]Earth Sciences New Zealand, [3]University of Auckland, [4]Australian National University, [5]Victoria University of Wellington

Internal waves (IWs) driven by tides and transient weather systems can displace isotherms by tens, even hundreds, of metres. These oscillations have been proposed to create thermal refuges on reefs and inshore habitats, either by (i) driving net cooling through shoaling of subsurface water or (ii) increasing thermal variability experienced by organisms. Here, we analyse 9-month bottom-mounted temperature records from two sites, north and south of Tawhiti Rahi / Poor Knights Islands, on the northeast shelf of New Zealand, providing the first extended observational record of internal wave activity at these biologically significant islands. High-frequency temperature variability linked to internal waves intensifies during summer and is primarily controlled by stratification, with only a weak influence from local wind forcing, and is stronger at depth, reflecting proximity to the seasonal thermocline. These observations are consistent with an idealised model of thermocline displacement, which illustrates how the vertical position of a temperature sensor relative to the thermocline governs the amplitude and waveform of reef-scale temperature fluctuations. We develop a set of metrics (e.g., frequency-filtering, rate of change in temperature, and temperature skewness) to characterise the episodic cold-water intrusions produced by IWs, providing a framework for assessing their ecological significance on temperate reefs.

Navigating a Global Invader: What Aotearoa's Exotic Caulerpa Response Gains from Cross Border Knowledge Sharing

Middleton I[1]

[1]Biosecurity New Zealand

The green algal genus Caulerpa contains several species recognised globally for their invasive behaviour. Since their detection in 2021, New Zealand has been managing incursions of Caulerpa brachypus and C. parvifolia (collectively termed exotic caulerpa). This discovery prompted extensive surveillance, tool development, and ecological research.

Since mid 2024, multi site monitoring has recorded a marked reduction in biomass, followed by partial recovery over the austral summer. These dynamics closely parallel international observations, where invasive Caulerpa has displayed pronounced "boom–bust" cycles. However, experiences in the Mediterranean and Australia show that population declines can be temporary, with biomass rebuilding when conditions become favourable. In line with international experience, the drivers of New Zealand's recent decline remain unresolved and are likely attributable to interacting environmental stressors.

New Zealand has also developed a suite of control tools that show promise at targeted scales. International experience indicates, however, that large scale eradication is unlikely due to fragmentation, persistence, and reinvasion pathways.

Together, insights from New Zealand, Australia, and the Mediterranean underline strong parallels and key differences, highlighting the value of international collaboration in interpreting biomass fluctuations, refining control tools, and developing flexible, evidence based management strategies for this resilient marine invader.

Rewilding Bluff Harbour via active marine restoration: Sea Nest/ Kōhanga Moana Pilot Study

Miller B[1], Davis G[2]

[1]E3scientific Ltd, [2]Sea Nest

Anthropogenic disturbances have modified the subtidal topography of Bluff Harbour, along with most harbour environments in Aotearoa. Restoration in the marine environment is challenging; due to cost, access, and large carbon footprints. To combat these challenges, we developed Kōhanga Moana/ SeaNests® an eco-engineered, rugose, low cost, stackable structure designed and built for NZ marine environments. The SeaNests provide habitats for fauna and suitable substrate for flora. They aim to restore, enhance and protect the capacity to harvest mahinga kai; provide effective technology for construction or retrofitting of breakwaters or surf breaks, have low carbon footprints and are cost-effective and available NZ-wide.

A pilot deployment of SeaNests® was undertaken in Bluff Harbour in May 2024 with local aquaculture companies. The structures were deployed on low-complexity soft-sediment habitat. Monthly monitoring over 12-months documented rapid biological colonisation of the SeaNests, with taxa richness increasing substantially within the first 6-months and remaining elevated relative to the surrounding unaltered benthic habitat. Colonisation showed temporal structure across functional groups, with early establishment of epiflora and mobile invertebrates, followed by sessile invertebrates and fish.

The observed biological response suggests measurable ecological benefits can be achieved through small-scale deployment, providing a practical pathway for restoration in coastal environments.

Growth, feed conversion and foraging of tāmure/snapper on pellets versus Greenshell mussels

Moran D[1], Blake C[1]

[1]Bioeconomy Science Institute

The Marlborough region harvests around 70,000 tonnes of Greenshell mussels (GSM) per year and generates a substantial side stream of non-harvested biomass that includes GSM rejects, blue mussels and a variety of other biofouling. Tāmure/snapper are known to graze on mussels and associated biofouling and could theoretically be grown in net pens using the non-harvested biomass as a way of adding value to GSM aquaculture and generating a unique, low-footprint fish product. We undertook a 50 day pilot study to compare the aquaculture performance (growth, feed conversion and product characteristics) of tāmure reared in tanks on conventional pellets versus GSM mussel meat (shucked and blanched). On an as-fed basis, fish fed mussels consumed 270% more feed than the fish fed pellets, but on a dry weight basis only 83% of the pellet treatment. Growth was slightly higher with the pellet diet (1.03% versus 0.96% weight gain/day). The feed conversion ratio was 4.11 for mussel meat and 1.33 for pellets on a wet weight basis, and was 1.17 and 1.27, respectively, on a dry weight basis. Converted to a whole mussel equivalent, it took approximately 10.3 kg of mussels to grow 1 kg of tāmure.

Carbon cycling and burial in Aotearoa / New Zealand fjords

Moy C[1], Wilson G, Riesselman C, Whibley L, Robb J, Mucciarone D, Illing M, Dunbar R, Gilmer G, Nelson F, Gorman A, Vandergoes M, Kitson J, Arnaud G

[1]University Of Otago

Fjords play a critical role in the global carbon cycle by storing large quantities of terrestrial organic carbon. They are recognised as carbon cycle “hotspots”, burying some of the highest amounts of organic carbon per unit area of any aquatic system. In Aotearoa New Zealand, Fiordland likely represents one of the nation’s most significant carbon sinks, where climate- and tectonically driven processes transfer large volumes of organic carbon from steep, forested catchments into suboxic fjord basins.

Despite this importance, the sensitivity of this carbon sink to environmental forcing remains poorly constrained. In particular, thresholds that could reduce carbon sequestration efficiency are not well understood, limiting our ability to predict system response to future climate change or inform environmental management.

I will present results from a multidisciplinary research programme designed to evaluate the sensitivity, efficiency, and capacity of the Fiordland carbon sink. Our approach integrates observations and modelling to quantify carbon burial and assess future sequestration potential under changing climate conditions. This work aims to constrain the drivers of fjord carbon burial and provide a scientific basis for informed management of these important coastal systems.

Where have all the seahorses gone? Assessing the status of Hippocampus abdominalis in the Hauraki Gulf Tīkapa Moana

Nessia H[1,3], Haggitt T[2,3], Daniel N[2,3], Thorburn C[1], Henderson D[1], Thorburn M[1], Hillman J[1,2]

[1]Kelly Tarlton’s Marine Wildlife Trust, [2]University of Auckland, [3]eCoast

The pot-bellied seahorse (Hippocampus abdominalis), or manaia, is Aotearoa New Zealand’s only native seahorse and the largest globally. Manaia are considered a taonga species, holding cultural significance for tangata whenua. They inhabit sheltered coastal environments, and are typically associated with structured habitats such as macroalgal forests and artificial substrates. In the Hauraki Gulf Tīkapa Moana, anecdotal evidence suggests localised declines and potential extirpations; however, there are currently no data on population trends to support this. Despite this, the most recent IUCN assessment (2016) ranks the species as being of ‘Least Concern’.

This project aims to assess the current population status of manaia populations by firstly repeating baseline surveys conducted 25 years ago at two sites, Ti Point (Leigh) and Schoolhouse Bay (Kawau Island). Secondly, to complement these surveys, we are undertaking a regionwide citizen science initiative to document seahorse sightings and better understand distribution patterns across multiple spatial scales. Lastly, in partnership with mana whenua, we will investigate the use of artificial structures (‘seahorse hotels’) to supplement existing seahorse habitat. Given their close association with Carpophyllum forests, improving habitat availability for manaia may have broader benefits for evaluating coastal ecosystem health and improving kaitiakitanga and broader management of coastal ecosystems.

From Shell to Shelter: Investigating fish recruitment on degraded seafloor restored with mussels and shell material

Ní Mhurchú A[1,2], Johnston L[1,2], Hillman J[1], Jeffs A[1], Benjamin E[1]

[1]Institute of Marine Science, University of Auckland, [2]Earth Sciences New Zealand

Reef-forming shellfish facilitate biodiverse ecosystems as they provide benthic habitat complexity. In Aotearoa New Zealand, green-lipped mussel (Perna canaliculus) reefs have been overharvested to extirpation, with a corresponding loss in biodiversity. The deployment of mussel shell material from aquaculture to the seabed has the potential to provide benthic substrate to rehabilitate the ecosystem services lost by the decline of these important bivalves. In this study, shell was deployed at three different heights (high, medium, and low), both with and without live mussels on top to assess the potential for shell to provide habitat for settling and recruiting small fish, using standard monitoring units for the recruitment of fish (SMURFs), over one year. Results indicated a two-fold increase in small fish abundance on shell habitats, and a five-fold increase of small fish on mussel habitats after one year. In addition, mussel habitats supported a 2-fold higher abundance of small fish compared to shell alone after one year. Diversity remained the same across all treatments, reliefs, and sampling periods, whilst height showed no influence. These results show that mussel shells, both alone and together with live mussels, offer a cost-effective, scalable approach to enhance fish recruitment on degraded benthic habitats.

Using natural analogues to investigate marine Carbon Dioxide Removal approaches in Aotearoa New Zealand

Nodder S[1], Law C[1,2], Cristi A[1], Halfter S[1], Drummond J[1], Behrens E[1], Collins C[1], Hale R[3], Pinkerton M[1], Smith S[4], van de Velde S[1,2]

[1]Earth Sciences NZ, [2]Department of Marine Sciences, University of Otago, [3]Earth Sciences NZ, [4]Ngāti Kahungunu Iwi Incorporated

Meeting international obligations to reduce global carbon emissions will require a level of human intervention. As marine systems play a critical role in controlling atmospheric CO^2, marine carbon dioxide removal (mCDR) techniques are being considered as possible solutions to maintaining global temperature increase to <2°C. These mCDR techniques aim to enhance natural biotic and abiotic processes, and include Ocean Alkalinity Enhancement (OAE), Terrestrial Biomass Sequestration, and Ocean Nutrient Fertilisation. A new five-year Endeavour Research Programme led by Earth Sciences NZ will evaluate the risks and potential of these techniques by a novel approach of using natural analogues in waters around Aotearoa New Zealand. The OAE study will focus on riverine and groundwater inputs of alkalinity in Te Matau-o-Māui Hawke Bay, with a research campaign in May 2026. Wood deposited on the Hawke Bay continental shelf during Cyclone Gabrielle and other extreme weather events will provide an analogue for Terrestrial Biomass Sequestration. Carbon export to the deep ocean during natural phytoplankton blooms in Subantarctic waters will be evaluated as a proxy for Ocean Nutrient Fertilisation. The research will deliver methods and protocols for Monitoring, Verification and Reporting (MRV) and Environmental Impact Assessments for mCDR that are appropriate to Aotearoa NZ waters.

Signals from the Horizon: What's emerging for Aotearoa New Zealand's marine science?

Oliver M[1], Stokes G[1], Geange S[2]

[1]Greater Wellington Regional Council, [2]Department of Conservation

Rapid environmental change, technological disruption, and evolving societal expectations are reshaping the context in which marine science operates. While much of our effort understandably focuses on immediate priorities, critical signals of future change are already visible at the horizon. This presentation shares insights from a recent horizon scan undertaken for the regional sector to identify opportunities and threats to achieving better environmental outcomes, and supported by national and international horizon-scanning exercises.

Many of the signals will be familiar, reflecting persistent barriers such as Treaty and governance uncertainty, affordability pressures, and growing populist distrust of evidence. However, the scan also identifies significant opportunities for Aotearoa New Zealand to better leverage science, data, partnerships and integrated resource management to deliver visible, cost-effective progress on climate and environmental challenges.

The presentation considers what these signals imply for future investment in marine science, partnership-based approaches, and the workforce capabilities needed to respond effectively. Horizon scanning is positioned as a practical tool to stress-test environmental research priorities, anticipate emerging pressures and opportunities, and strengthen the evidence base to support more adaptive, future-ready knowledge and insights for decision-making.

Disturbance-recovery dynamics of estuarine ecosystem functioning post Cyclone Gabrielle: Informing and validating a spatial decision support tool

Petersen G[1], Lam-Gordillo O[1], Mangan S[2], Bennion M[1], Bulmer R[3]

[1]Earth Sciences New Zealand, [2]Earth Sciences New Zealand, [3]Tidal Research

Extreme weather events (EWE) can negatively impact estuarine ecosystem function (EF) and are predicted to increase in frequency and intensity due to climate change. Understanding their effects on EF is essential to predict estuarine resilience and recovery. Our study had two aims: to evaluate the effects of an EWE (Cyclone Gabrielle, 2023) on macrobenthic communities and EF in two New Zealand estuaries, and to construct a Bayesian Network model to identify changes in EF under increasing sedimentation regimes (as a proxy for EWE impact).

Results showed the EWE caused significant temporal changes in macrobenthic metrics. EF also shifted as macrobenthic communities and functional traits changed, suggesting disruption of key processes. Our findings provide evidence of relatively rapid and nearly complete recovery to pre-cyclone conditions within a year. More frequent extreme weather events might surpass the recovery periods of estuarine ecosystems.

Under three sedimentation impact scenarios (+5%, +10%, +20% mud), we assessed immediate decreases in EF in a Hawkes Bay estuary. The extreme sedimentation scenario (20%) reduced gross primary productivity (GPP) by ~5%. However, increases from 5% to 20% produced diminishing reductions in GPP, suggesting lower-intensity, more frequent EWE may be particularly harmful to estuaries.

Genome-Wide Analysis of Population Structure and Gene Flow in the New Zealand Black Coral Antipathella fiordensis

Pierotti M[1], Whibley A[2,3], Collina M[1], Ritchie P[1], Bell J[1]

[1]Victoria University Of Wellington, Te Herenga Waka, [2]Grapevine Improvement, Bragato Research Institute, [3]School of Biological Sciences, University of Auckland Waipapa Taumata Rau

Determining levels of genetic variation within and among populations is fundamental for effective conservation genetic management. In temperate mesophotic ecosystems (TMEs), sessile and long-lived taxa such as black corals play key ecological roles by forming complex three-dimensional structures that support diverse associated fauna and contribute to nutrient cycling and habitat complexity. Despite their ecological significance, levels of genetic variation and population structure of temperate black corals remain largely unexplored. In New Zealand's Fiordland system, the endemic black coral Antipathella fiordensis dominates shallow mesophotic zones (< [2]0 m), where low-light conditions are more typical of deeper habitats. Fiordland's environmental conditions provide an opportunity to address key questions about black coral population connectivity, adaptive capacity, and resilience to environmental change. Through whole-genome sequencing, we investigate the population structure and adaptive variation in A. fiordensis across multiple Fiordland populations. By generating a high-resolution SNPs dataset, we assess patterns of genetic differentiation, identifying both neutral SNPs reflecting demographic history and connectivity, and putatively adaptive loci that may underpin resilience to environmental gradients. Our findings will provide a genomic baseline for black corals and support management of key TME species, highlighting the potential of genomic tools to address conservation issues in non-model taxa.

Mapping change in New Zealand estuaries, sounds and fiords using high-resolution Sentinel-2 satellite observations

Pinkerton M[1,2], Atwood E[3], Whiteside A[4], Pearson R[4], Tilstone G[3]

[1]Earth Sciences New Zealand, [2]Te Pūnaha Matatini, Centre of Research Excellence for Complex Systems, [3]Plymouth Marine Laboratory, [4]Earth Sciences New Zealand

Satellite remote sensing is used to monitor change in coastal water temperature, suspended sediment concentration, phytoplankton abundance and water clarity at the NZ national scale (SCENZ: Seas Coasts and Estuaries New Zealand). However, at 500 m resolution, SCENZ observations are often missing for the 1-2 km closest to shore and in narrow inlets, estuaries, harbours, sounds and fiords.

A new project between Earth Sciences New Zealand and Plymouth Marine Laboratory (UK) used high-resolution (60 m) satellite products from the European Space Agency's Sentinel-2 satellites to investigate sediment and phytoplankton concentration in four areas: (1) Hauraki Gulf and Kaipara Estuary; (2) Marlborough Sounds; (3) Canterbury Bight (including Lake Ellesmere); and (4) Fiordland.

Sentinel-2 data reveal fine-scale structure in suspended sediment and phytoplankton biomass, and allowed change between 2016 and 2025 to be analysed. Match-up analysis shows generally good consistency between Sentinel-2 and SCENZ but important discrepancies highlight the importance of in situ bio-optical sampling. We also present a new method to use spatial patterns of coastal water quality trends to understand patterns of coastal change, attempting to separate land-use/catchment and climate drivers.

We recommend extending Sentinel-2 capability to the whole New Zealand coastal zone in the future.

Māra Moana: Building and studying a hanging ocean garden with Whakarongo, Titiro and Korero

Reti H[1,2,3], Carpenter R[1,2], van Rossem H[4], Quinn W[4], Hall J[4], Stanley J[5], Pinkerton M[1,6]

[1]Mohimohi Moana Foundation, [2]Ngāti Wai, [3]Ngāpuhi, [4]Earth Sciences New Zealand, [5]University of Waikato, [6]Te Pūnaha Matatini, Centre of Research Excellence for Complex Systems

Mohimohi Moana Foundation is a Maori-led, Hapu-based Charitable Foundation. In October 2026 we secured a 35-year consent to establish three Marae community one-hectare Māra Moana (Ocean Gardens), supported by a fisheries non-commercial aquaculture licence. Our goal is to grow Taonga Kaimoana such as Kutai Tipa, Paua, Rimurimu, Tio, and Kokata. We also want to explore ocean rewilding for conservation. We describe using autonomous instruments on the seabed to find out what was happening 24/7 in and around our Māra Moana Ocean Gardens prior to setting up the aquaculture infrastructure. We describe the first data from acoustic recording and video camera stations that are set up in our ocean gardens, and will stay there for the next year. An associated challenge was how to close the gap between Matauranga practitioners and western scientists in the field of marine ecology, aquaculture, conservation and regeneration. We have adopted the concept of Whakarongo, Titiro and Korero in our approach to collaboration with Earth Sciences New Zealand and the University of Waikato. This leads to listening and hearing, looking and seeing and the full spectrum of communication between each party with the underlying principles of respect, trust, hospitality and generosity.

A functional trait framework for quantifying and valuing temperate mangrove ecosystem services

Qu Z[1], Lam-Gordillo O

[1]Earth Sciences New Zealand

Mangroves ecosystems play an important role in ecosystem functions and services, such as coastal protection, food provisioning, and carbon sequestration. However, frameworks that quantify and value these ecosystem services are lacking. Furthermore, assessments that aggregate different ecosystem service valuations together without double counting are absent. Our study develops a functional trait framework that links mangroves functional traits, ecosystem functions, ecosystem services, and their economic valuation. We used a statistical weighting approach to integrated published functional traits data with secondary ecosystem services valuation. Our study provides a novel approach linking ecological trait data with economic valuation data, enabling a more scientifically robust representation of mangrove ecosystem service values. Through this approach, we can better estimate the costs and benefits that mangrove ecosystems provide to society, and more effectively evaluate their role as a nature-based solution for climate change adaptation, strategic decision-making, and policy frameworks.

Selection of new microalgal strains for mussel spat nurseries

Sampollo L[1], Jeffs A[1]

[1]University Of Auckland

Optimising live feed delivery for juvenile bivalves is critical for the economic sustainability of shellfish aquaculture. While nurseries typically utilise hatchery-grade microalgae (< 10 µm), evidence suggests early juveniles are more efficient in capturing larger cells. This study investigated the feeding of green-lipped mussel spat (Perna canaliculus) in two size classes (1 and 2 mm shell length) using ten microalgae strains with diverse physical traits (4–20 µm diameter, varying morphology and motility). Performance was quantified via cell concentrations and organic biomass in mono- and mixed-microalgal diets.

Capture efficiency was significantly influenced by physical cell traits. Although diameters > 10 µm did not inherently increase capture rates, large, organic-dense cells maximised total biomass acquisition. Elongated cell geometries were associated with higher capture rates, while motility exerted negligible influence. Ontogenetic shifts in feeding capabilities were not observed between 1 and 2 mm spat. However, mixed-microalgal diets enhanced the capture of species poorly filtered in mono-microalgal diets.

The findings demonstrate that cell counts are an insufficient proxy for feed capture. Therefore, to maximise total organic acquisition by juvenile mussels, nursery managers should prioritise large, organic-dense microalgae strains with streamlined geometries and employ mixed-species diets.

Fine-scale seagrass monitoring in Tauranga Harbour: insights, limitations, and future directions

Sanchez-medina R[1], Crawshaw J

[1]Boprc

Seagrass meadows are a key component of coastal ecosystems in Aotearoa New Zealand. In Tauranga Harbour, a fine-scale monitoring programme across multiple sites assesses seagrass condition using key biometrics: percent cover, leaf length, and leaf width across tidal zones and environmental gradients.

Results from 2023–2026 monitoring, combining summaries and statistical analyses, showed strong spatial variability across biometrics, with site effects consistently significant. Seasonal patterns were less consistent and appeared site-specific, indicating that local environmental drivers dominate fine-scale variability. These patterns likely reflect interacting pressures such as sedimentation, nutrient enrichment, hydrological changes, and biological factors (e.g. grazing), highlighting the importance of broader environmental context.

While some sites show stable or improving trends, high variability at others highlights the challenge of detecting change over short timeframes. This raises a key question: are current monitoring metrics sufficient to detect meaningful ecological change?

This presentation will explore opportunities to strengthen monitoring, including additional indicators and new analytical approaches (e.g. AI-assisted image analysis) to improve efficiency and consistency. By sharing findings and challenges, we aim to encourage broader discussion across organisations and groups on effective approaches, emerging tools, and how fine-scale monitoring can better support seagrass management in New Zealand.

Snapper as sentinels for kelp forest ecosystem changes

Scafidi K[1], Wing S[1]

[1]University of Otago

Kelp forests are ephemeral and susceptible to disturbance events, whether acute or chronic, and are even more sensitive to these changes given the increased intensity and frequency of disturbance regimes. While some natural variation in kelp forest density and distribution has been observed for centuries, higher than average temperatures past the thermal tolerance of macroalgae, sedimentation, and strong storm events are killing and physically removing kelp from many rocky reef systems. Fishes can be sentinels for changes to kelp forests wrought by both chronic and acute disturbances because they develop layers to their eye lenses (laminae) throughout their lifetime. These laminae are layers of protein that do not have any metabolic turnover, so they contain a record of the food web position of fish throughout ontogeny. Using this technique along with aging from otoliths, we can construct a time series of disturbances in these different channels of organic matter coming into coastal food webs that support fish. We compare snapper (Chrysophrys auratus, tāmure) from Hauraki Gulf, Bay of Plenty, and Taranaki to investigate environmental impacts to the food webs that support fish populations.

Coastal management and the wrong solutions to the wrong problems

Schiel D[1], Thoral F[2], Orchard S[3], Tait L[4], Battershill C[5]

[1]Canterbury University, [2]Earth Sciences (NIWA) NZ, [3]Waterlink NZ, Canterbury University, [4]Earth Sciences (NIWA) NZ, [5]Waikato University

Even after 50 years of Marine Protected Areas in New Zealand, coastal rocky reef communities continue to degrade. Many dominant stressors operate beyond the reach of MPA protection or conventional management, including ocean warming, sea-level rise, marine heatwaves and dark events, and shifting oceanographic boundaries. These broad-scale drivers increasingly shape the condition of coastal ecosystems and the services they provide. Although there have been important gains, such as reductions in point-source pollution, fisheries management, and the uptake of nature-based approaches to coastal hazards, integrated management of sediments and contaminants from land-to-sea has lagged, with often severe consequences for reef systems. Here we highlight the impacts of sediment pulses from major storm events on coastal reefs, including those with MPAs. Effects include kelp smothering, disrupted recruitment, and diminished light quality, constraining primary productivity and cascading through the ecosystem. Our MBIE programme, Toka ākau toitu Kaitiakitanga, applies a mātauranga Māori–science nexus, combining tools such as e-DNA, stable isotopes, environmental chemistry, drones, acoustics, and satellite observations to generate spatially explicit insights. Working with partners and agencies, the focus must shift to managing tractable stressors, strengthening land–sea integration, and safeguarding ecological, economic, and cultural values that depend on intact rocky reef ecosystems.

Continuing the longterm study of deep-sea coral recovery on the Graveyard Knolls using the German RV Sonne

Schnabel K[1], Beaumont J[1], Holland L[2], Freiwald A[3]

[1]Earth Sciences New Zealand, [2]Department of Conservation Te Papa Atawhai, [3]Department Marine Research at Senckenberg am Meer

In early 2025, the RV Sonne explored the Aotearoa New Zealand cold-water corals using the ROV Squid 2000, a towed-camera system (voyage SO309 'CoralNewZ') and a variety of sampling equipment. Among the highlights were the discovery of ancient coral communities (coral mounds) indicating the long-term persistence of hard corals on deep seamounts, and deep-water coral communities of the deep fjords of the Fiordland Marine Region. We also continued the nearly 30-year time series examining recruitment dynamics and recovery potential of deep-water corals on a Chatham Rise seamount complex. Here, we provide a summary of scientific findings of the research voyage, and preliminary results of in situ observations on transects over disturbed and undisturbed seamount habitats. The analysis of the spatial and abundance data of coral communities on the four seamounts will be compared to previous data to assess change over time, particularly in relation to the recovery of deep-sea coral communities following the cessation of fishing activities on closed seamounts.

Around Te Waipounamu in 17 days, highlights and an update on a multidisciplinary survey of cold-water coral communities of Aotearoa New Zealand on the German RV Sonne

Schnabel K[1], Beaumont J[1], Bostock H[2], Brix S[3], Davidson S[1], Holland L[4], Kniest J[5], Knorrn A[6], Korfhage S[7], zu Löwenstein A[3], Okuma E8, Titschack J8, Walton K9, Beuck L[6], Freiwald A[6]

[1]Earth Sciences New Zealand, [2]School of the Environment, University of Queensland, [3]Senckenberg am Meer, Deutsches Zentrum für Marine Biodiversitätsforschung (DZMB) & University of Hambug, [4]Department of Conservation Te Papa Atawhai, [5]GEOMAR - Helmholtz Centre for Ocean Research , [6]Department Marine Research at Senckenberg am Meer, [7]Helmholtz Institute for Functional Marine Biodiversity (HIFMB), [8]MARUM - Center for Marine Environmental Sciences, University of Bremen, [9]Museum of New Zealand Te Papa Tongarewa

The German Research Vessel Sonne expedition SO309 – "CoralNewZ" was a German–New Zealand collaborative deep-sea research voyage conducted in early 2025. Part of broader international studies, it contributed to investigations of how cold-water coral (CWC) ecosystems form, persist, and respond to environmental change, particularly past and present climate variability. CWC are long-lived ecosystem engineers and are highly relevant for biodiversity conservation and marine management in Aotearoa New Zealand and internationally.

We provide a summary of the voyage and the subsequent research conducted so far, including the first detailed survey of the Rakiura Hills off Otago and studies of the deep basins of the Patea Doubtful and Tamatea Dusky Sound systems and the continental margin outside Piopiotahi Milford Sound. Equipment included high-resolution multibeam/PARASOUND swath mapping, a state-of-the-art Remotely Operated Vehicle, water, sediment and rock sampling gear. While research continues, new findings so far include detailed seafloor maps, buried coral mounds, descriptions of water chemistry, new species and in situ observations of coral communities, including evidence of human impact.

Climate change risks to marine habitats in the Bay of Plenty Region

Taikato V[1], Davis-Jones C

[1]BOPRC, [2]SLR Consulting

Current scientific understanding of climate change impacts on marine habitats in the Bay of Plenty, New Zealand, highlights the need for adaptation and restoration planning. A risk assessment approach was applied to key habitats in the Bay of Plenty region, including mangroves, saltmarsh, seagrass, soft sediments, shellfish beds, dunes, kelp forests, and sponge gardens, under present-day and future climate scenarios (SLR, 2025). Major stressors influencing these systems include sea level rise, coastal erosion, heatwaves, and increased sedimentation driven by extreme weather events.

Vulnerability varies among habitats. Kelp forests and sponge gardens are at high risk and are likely to face extreme risk under future conditions. Seagrass, shellfish beds, and soft sediment habitats are expected to shift from moderate to high or extreme risk by 2050 to 2100. In contrast, mangroves and saltmarsh may show lower short-term vulnerability but are increasingly exposed to long-term pressures such as coastal squeeze and inundation.

These patterns highlight the interconnected nature of climate stressors and the need for adaptive, ecosystem-based management. Future approaches could integrate climate modelling to anticipate events such as heatwaves, alongside nature-based solutions including habitat restoration, dune stabilisation, and shellfish re-establishment, to enhance resilience and support climate adaptation.

Where are we now? Aotearoa and the UN Decade of Ocean Science for Sustainable Development 2021-2030

Thomson T[1], Bieda S

[1]Earth Sciences New Zealand, [2]Kāhui Manaaki Tangaroa - NZ National Decade Committee

Aotearoa has a unique approach to the UN Decade of Ocean Science, with mātauranga Māori at the centre of the mahi and activities under the Decade. Bringing together the knowledge and discoveries of science with the wisdom and practices of our ancestors can achieve innovation and opportunity beyond that of science alone. This collaboration of knowledge systems and approaches has gained widespread interest internationally and has helped inform and shape the Ocean Decade to broaden its focus, achievement and outcomes. As preparations begin for the upcoming 2027 Ocean Decade Conference in Brazil, we will highlight domestic activities that are being supported by the Kāhui Manaaki Tangaroa – the New Zealand National Decade Committee. In the past year, we have supported many activities to strengthen the Decade's impact in Aotearoa and have collaborated with a range of other Decade committees around the world to achieve the goals of the Decade. Kāhui Manaaki Tangaroa is well positioned to contribute uniquely to the global ocean collaboration. All these activities contribute to further understanding our moana, why its health is declining, and how we can all be part of the solution for a healthy moana, for generations to come.

Tohe i te Toheroa: Assessing the vulnerability of a taonga species to climate change

Thomson T[1]

[1]Earth Sciences New Zealand

Climate Change Vulnerability Assessments (CCVAs) have been used internationally to assess species' sensitivity and exposure to a changing climate. Recently, this framework has been used to assess the vulnerability of freshwater taonga and fisheries species in Aotearoa. As climate change alters the environments in which taonga species inhabit, challenges arise in their protection and management. Māori have close connections to their oceans, freshwaters and taonga species, including the toheroa (Paphies ventricosa). This taonga is important not just for sustenance; the toheroa plays a key role in upholding values such as manaakitanga and kaitiakitanga, and the survival of mātauranga Māori. The impacts of historical mass declines in toheroa populations across Aotearoa continue to be widely felt today, and the way in which iwi interact with the toheroa necessarily continues to evolve. The vulnerability of the toheroa to climate change has been assessed using the CCVA methodology, to ensure iwi are best informed when making decisions regarding the revitalization and improved management of the toheroa. This new piece of research, combined with generations of Mātauranga Māori and knowledge of traditional resource management practices, is the key to ensuring a future for this taonga species in Aotearoa.

Validation of the Hydrodynamics of the Kaituna River Re-diversion and Maketū Estuary Enhancement Project to Meet Consent Conditions

Tuckey B[1]

[1]DHI

The Kaituna River re-diversion and Maketū Estuary enhancement project re-introduced controlled river flows to the estuary. This followed decades of degradation caused by diversion of the river away from the estuary in 1956. The new re-diversion control gates were opened in 2020, and early monitoring indicates positive ecological and morphological responses within the estuary.

The project was funded by Bay of Plenty Regional Council and delivered in collaboration with tangata whenua and the wider community.

The project's resource consent conditions presented an opportunity to undertake post-construction validation of a numerical hydrodynamic model developed by DHI to predict the project impacts prior to construction. A key concern addressed through the consent process was any impacts on boating access through the river mouth.

Consent conditions required post-construction validation of modelled ebb tide volumes in the lower river under comparable tidal and river flow conditions. Mitigation would be triggered if pre-project and post-project volumes differed by more than 20%.

This presentation outlines the project objectives, outcomes achieved to date, the data collected to satisfy the consent conditions, and how these data were used to validate model predictions. The work demonstrates how routine post-construction verification of numerical models can strengthen public confidence in modelling.

(Plankto)Scoping Estuarine Plankton Communities as Bioindicators of Water Quality

van Leeuwen A[1], Della Penna A[2,3], O'Callaghan J[4], Dickson M[1], Ryan E[1]

[1]University Of Auckland, Environmental Science, [2]University Of Auckland, Marine Science, [3]University Of Auckland, School of Biology, [4]Oceanly

Plankton community composition responds quickly to changes in water quality, making it an effective indicator of environmental change. In addition, plankton shifts can reveal nutrient transfer between trophic levels that conventional, more expensive, nutrient sampling misses. Despite these advantages, the application of plankton-based indicators is hampered by time-intensive microscope processing and the taxonomic expertise required. Recent developments of the PlanktoScope (semi-automated microscope) and EcoTaxa (automated plankton classification software) have streamlined plankton processing and identification. This, along with the relatively low cost, makes this approach suitable for expanding and facilitating both council- and community-led water quality monitoring programs.

We aimed to develop an accessible, plankton-based water-quality indicator using these new tools. To do so, 52 plankton samples from the Kaipara Harbour were compared to simultaneously collected salinity, turbidity, chlorophyll a, and nutrient data. Preliminary Redundancy Analysis (RDA) demonstrated that plankton community composition can indicate both broad and specific changes in water quality. I.e., the relative abundance of Lithodesmium was positively correlated with PO4 and NH4, whereas Pseudo-Nitschia was negatively correlated with NH4, NOx and turbidity. These relationships were used to classify plankton by water-quality sensitivity and develop bioindicator groups for good, moderate, and poor conditions. The results will be presented.

Mechanisms of change in the rocky intertidal: poleward range contraction of a subantarctic limpet

Virgin S[1], Schiel D[1]

[1]University Of Canterbury

Climate change has caused poleward range contractions of numerous species. Such range shifts in the intertidal zone are often caused by a combination of increased aerial and water temperatures. Relatively little biogeographic research has been done on intertidal species in New Zealand, but museum records suggest that a common cold-water limpet species (Cellana strigilis) range has contracted substantially since the 1990s. To determine if and why C. strigilis range contracted, we sampled multiple sites along the east coast, tested the thermal limits of adult limpets, reared larvae at a range of temperatures to determine thermal tolerance, and hindcasted adult limpet body temperatures using a heat-budget model. No C. strigilis were found near their historic northern range limit in Kaikōura, suggesting a poleward range contraction of ~350km to their current northern range limit in Oamaru. Heat budget modelling and analysis of sea-surface temperatures (i.e., larval body temperatures) indicated that the northern range limit of C. strigilis was limited by a both larval thermal tolerance and adult thermal tolerance, particularly around Banks Peninsula. This shows the importance of incorporating life history stages into determinations of species resilience, especially for intertidal organisms with pelagic larval stages that experience completely different conditions from adults.

PasSIV: Experimental Validation of a Novel Passive eDNA Sampler-Chasing eDNA Signals Across Marine Systems from Tobacco to Mussel Larvae

von Ammon U[1], Sáenz-Agudelo P[1,2], Pochon X[1,2], Laroche O[1], Jacobs R[3], Bell P[3]

[1]Cawthron Institute, [2]University of Auckland, [3]New Zealand Institute of Bioeconomy Science

Reliable and scalable environmental DNA (eDNA) sampling remains a key challenge for marine monitoring. Here, we present a comprehensive evaluation of a novel passive sampling device (PasSIV) across controlled laboratory systems and field deployments, targeting free DNA (tobacco), microalgae (Nannochloropsis sp.), and an aquaculture-relevant organism, Perna canaliculus larvae. Performance was assessed in a closed-circuit flume tank and across diverse coastal environments using complementary molecular approaches (ddPCR and metabarcoding).

Passive samplers consistently captured eDNA from all targets, with performance comparable to, and sometimes exceeding, conventional active filtration. Targeted ddPCR enabled sensitive and quantitative detection, while metabarcoding provided broader biodiversity context. Importantly, passive sampling accumulated eDNA signals over time, effectively averaging short-term fluctuations and reducing the risk of false negatives associated with transient or patchy DNA distributions. This time-integrated signal provides a more representative measure of organism presence, particularly in dynamic systems or where repeated sampling is impractical.

Field deployments revealed clear and ecologically meaningful spatial patterns, demonstrating robustness under real-world conditions. Overall, PasSIV represents a scalable, low-effort tool for marine biosecurity, biodiversity monitoring, and long-term ecosystem surveillance, capturing signals across trophic levels, from microorganisms to fish and even seabirds.

Artificial Intelligence Annotations Capture Ecological Patterns in SpongeDominated Temperate Mesophotic Ecosystems

Bell J[1], Witting K[1], McAllen R[2], Micaroni V[1], Rogers A[1], Woods L[1], Harman L[2]

[1]Victoria University of Wellington, [2]University College Cork

Manual image annotation is a major bottleneck for long-term benthic community monitoring, particularly as recent advances in marine imaging have generated volumes of images and video that far exceed the capacity for manual processing. Spongedominated temperate mesophotic ecosystems (TMEs) are widespread, but their ecological importance remains poorly understood, with their complex morphological

characteristics creating challenges for automated image annotation. Here, we evaluated the performance of an existing AI-based annotation framework (CoralNet) for annotating images collected from a long-term monitoring program of sponge-dominated TMEs at Lough Hyne, Ireland (2018-2024). A classifier was trained on 300 manually annotated

images and validated against an independent test set of 265 images. Classifier outputs were compared to expert annotations using species-level classification accuracy and taxonomic confusion patterns, percentage-cover estimates, community structure and temporal community trends. The trained classifier achieved an overall accuracy of ~ 75%, with higher performance for visually distinct and common taxa and lower accuracy for
rare or morphologically complex forms. Despite species-level misclassifications, AIderived annotations closely matched expert-derived ecological patterns, preserving sitelevel structure and temporal community trajectories across the time series. Together, these results demonstrate that AI-assisted annotation can provide a reliable and scalable alternative to manual image annotation for monitoring benthic community dynamics in sponge-dominated temperate mesophotic ecosystems.

Membrane remodeling mediates differential acclimation and resilience to marine heatwaves in temperate sponges

Wood G[1]

[1]School of Biological Sciences, Victoria University of Wellington, [2]School of Biological, Earth and Environmental Sciences, University College Cork, [3]School of Chemical and Physical Sciences, Victoria University of Wellington

The increasing frequency and intensity of marine heatwaves (MHWs) pose a growing threat to sessile marine organisms. Sponges are ecologically important in marine ecosystems worldwide, yet their ability to acclimate to MHWs remains poorly understood. Here, we used a lipidomic approach to investigate how three abundant temperate marine sponge species (Tethya bergquistae, Crella incrustans, and Suberites australiensis) responded to simulated MHW conditions in an ex situ laboratory experiment over [33] days. As key components of cell membranes, phospholipid-derived fatty acids (PLFAs) mediate stress responses through desaturation and elongation. We quantified PLFAs both in situ and following a [33]-day exposure to a MHW. We then linked PLFA composition and abundance to physiological parameters (survival and respiration). The most resilient species, T. bergquistae and C. incrustans, exhibited higher proportions of saturated fatty acids under MHW conditions compared to the control treatments. In contrast, the species with the lowest survival, S. australiensis, showed greater fatty acid unsaturation compared to the controls, likely resulting in increased membrane permeability and susceptibility to peroxidation. These results suggest that S. australiensis may be less likely to persist under MHW conditions, whereas T. bergquistae and C. incrustans demonstrate cellular acclimation mechanisms that may support resilience.

Mapping subtidal seagrass using boat based hydroacoustics and video systems. A case study from Te Rerenga Parāoa (Whangārei Harbour)

Zabarte-Maeztu I[1], Lam-Gordillo O[1], Maurice A[1], Taumoepeau A[1], Lohrer A[1]

[1]Earth Sciences New Zealand (ESNZ)

Seagrasses such as Nanozostera muelleri play a key role in coastal ecosystems because of the ecological goods and services that they provide, enhancing biodiversity, productivity and carbon sequestration. Despite their ecological relevance, their distribution is, to date, insufficiently documented and likely underestimated particularly in the subtidal zone. New Zealand seagrass is mostly reported as intertidal, however there are subtidal meadows at offshore islands and large estuaries and harbours currently unmapped and unreported. Here, we adapted and tested a boat based hydroacoustic remote sensing technique commonly used in freshwater ecosystems. Results were ground-truthed with video imagery and divers to detect and map subtidal seagrass meadows in Whangārei Harbour. The trial validated the utility of this method for seagrass monitoring, revealing 4.12km² of subtidal seagrass (23% of the seagrass in the harbour) that could not be detected previously from aerial or satellite imagery alone. We demonstrate the potential of this novel method to efficiently identify and map undocumented and underestimated subtidal seagrass meadows in Aotearoa. The development of new mapping strategies is essential to advance seagrass monitoring, management and restoration which is critical in a future of rising sea levels and pressures on coastal ecosystems.

Restoration meets reality: Seagrass Restoration Trial in Waihī Estuary

Zabarte-Maeztu I[1], Lam-Gordillo O[1], Paul-Burke K[2], Burke J[3], Douglas E[1], Hailes S[1], Lohrer A[1]

[1]Earth Sciences New Zealand (ESNZ), [2]University of Waikato, [3]Te Rūnanga o Ngāti Whakahemo

Seagrass meadows worldwide are in decline due to cumulative stressors that degrade water quality and substrate conditions, exacerbated by ongoing climate change, prompting increasing interest in restoration as a management response. Here, we combine Ngāti Whakahemo Indigenous knowledge, habitat suitability modelling, and a field based restoration trial to evaluate the feasibility of restoring Nanozostera muelleri in Waihī. Environmental assessments indicated that the selected restoration sites met commonly reported thresholds for seagrass growth, with adequate light availability and favourable sediment organic matter and mud content. Habitat suitability modelling further identified these sites as areas of high restoration potential. However, despite selected sites predicted to support seagrass, transplanted material declined consistently. Seagrass cover, shoot density, and leaf length decreased significantly from initial planting indicating that acute stressors limited early establishment. These results highlight a clear mismatch between broad scale habitat suitability and fine scale environmental conditions that determine transplant success. Our study highlights the need for multi scale, evidence based restoration planning that combines site level interventions with reductions in catchment derived nutrient and sediment inputs, without which long term recovery is unlikely. By combining Indigenous knowledge, spatial modelling, and empirical trials, this work provides a framework for improving seagrass restoration outcomes.

The Cross-Shelf Exchange (C-SEX) database: 27 years of New Zealand coastal ocean surveys, states and trends

Zeldis J[1]

[1]Earth Sciences NZ

The Earth Sciences NZ Cross-Shelf Exchange (C-SEX) Database covers coastal ocean surveys carried out in Aotearoa New Zealand's Te Ika-a- Māui North Island northeast continental shelf, Tīkapa Moana-o-Hauraki Hauraki Gulf and adjacent Firth of Thames, and Te Tai-o-Aorere Tasman Bay and Mohua Golden Bay. The database holds data from inception of surveying in 1996 to its termination in 2023, collected on 105 research voyages.

C-SEX data cover the time-space arrays of sampling, ocean physics (temperature, salinity, density, oxygen, transparency, light), macronutrient and carbonate chemistry, phytoplankton chlorophyll, bacterioplankton, phytoplankton and micro-and mesozooplankton counts, biomasses and taxonomy. The data are freely available to non-commercial users via EarthSciences NZ's 'DataHub', either in relational format (Microsoft Access) or as flat files. A Database User Guide is included.

The C-SEX database has supported 37 peer-reviewed publications and 23 client reports, addressing ocean-coast water mass and biogeochemical exchange, time and space trends in plankton ecology, and regional susceptibility to eutrophication – related ecosystem stressors. Resource management applications have included water quality, aquaculture, point and diffuse catchment loading effects, marine spatial planning and conservation ecology. Some of these results are described in this talk, centred on the Hauraki Gulf and Firth of Thames.

POSTER ABSTRACTS

Abstracts are ordered alphabetically

Restocking with aquaculture-sourced mussels for benthic restoration under participatory co-management: the case of Choromytilus chorus in Chile

Riquelme R[1], Ávila M[1], Benjamin E[2], Gutierrez J[1], Aroca G[1], Jeff A[2]

[1]Centro Acuícola Pesquero de Investigación Aplicada (CAPIA), Facultad de Recursos Naturales y Medicina Veterinaria, Universidad Santo Tomas, [2]Institute of Marine Science, University of Auckland

The recovery of overexploited benthic resources such as Choromytilus chorus, commonly known as the choro zapato or shoe mussel, requires restoration approaches that integrate species biology, environmental conditions, and management practices. This study evaluated the restocking of C. chorus using aquaculture-sourced individuals in southern Chile. Baseline assessments were conducted in 2020 prior to restocking, followed by monitoring during 2020 and evaluations in 2021, 2024, and 2026, including a final direct assessment using the same sampling design. Two sites (sites A and B) were selected based on participatory mapping with artisanal fishers and habitat suitability. C. chorus (~6.4 cm) were deployed using biodegradable cotton mesh units (60 per site), placed on the seabed without fixation at ~15 ind/m². Results showed strong site-dependent outcomes. Site A reached 56% survival at six months and 39% after six years, with sustained growth and burial resembling natural beds. Site B showed total mortality within one month due to predation and substrate instability. Density increased from 0.3 to 3.1 ind/m² between 2020 and 2026, but populations remained dominated by adults, with no visual recruitment. These results indicate structural recovery without natural recruitment, highlighting the need to integrate habitat suitability, species biology, and governance for future restoration.

The Effect of Pellet Hydration on the Performance of Juvenile Chinook Salmon (Oncorhynchus tshawytscha) Feeds

Bell E[1], Magnoni L[1], Moran D[1], Jerez N[2], Tapsuri C[2], Nicholson G[3], Symonds J[3], Fletcher K[2]

[1]Bioeconomy Science Institute, Seafood Production, [2]Bioeconomy Science Institute, Food and Bioproducts Technology, [3]Cawthron Institute

The water content of aquafeeds is relevant for three reasons: fish evolved to eat prey with high water content 70-85% but pellets are almost dry; pellet hydration and loss of cohesion in the stomach may contribute Gastric Dilation Air Sacculitis (GDAS) syndrome; and pellets delivered via hydraulic conveyance systems absorb water. We investigated feed intake (FI), specific growth rate (SGR), feed conversion ratio (FCR), and GDAS in Chinook salmon (Oncorhynchus tshawytscha) fed pelletised diets at three moisture levels: non-hydrated control (3% water), low hydration (LH 31%), and high hydration (HH 45%). Fish were reared for 60-days in 2500-L tanks with three replicates/treatment (body weight (BW) 178 g, 104/ tank). Hydration was achieved by adding filtered seawater to pellets prior to feeding. Fish were fed twice daily to apparent satiation and uneaten pellets quantified. Pellet intake was correlated with hydration level, with a 40% increase between control and HH treatments. Conversely, FI on a dry matter basis was 10% higher in the control. BW and SGR were similar among treatments. FCR improved with hydration, decreasing from 1.24 (control) to 1.16 (HH). No signs of GDAS were observed, indicating hydrated, specifically formulated pellets may improve FCR without compromising growth or health.

Determining the relative roles of temperature and light in the mass bleaching event of sponge Cymbastela lamellata during marine heatwaves

Campbell L[1], Cornwall C[1], Bell J[1]

[1]Te Herenga Waka - Victoria University Of Wellington

New Zealand's coastal ecosystems have experienced several recent severe marine heatwaves (MHWs), which are expected to increase in intensity, frequency, and duration in the future. Importantly, previous New Zealand MHWs resulted in bleaching and/or necrosis of several sponge species. Cymbastela lamellata is a functionally important, highly abundant sponge that forms a symbiosis with photosynthetic diatoms. C. lamellata experienced a mass bleaching event in 2022 after a severe MHW, impacting >90% of sponges in Fiordland. However, during this MHW, the lack of precipitation in Fiordland modified the light dynamics, increasing photosynthetically active radiation (PAR) at depth. In an earlier MHW experiment, some C. lamellata developed necrosis and partial bleaching although not at levels seen in situ. In contrast, this study explores whether an increase in both PAR and temperature was responsible for responses seen in C. lamellata. In a 40-day experiment, we measured oxygen flux, Fv/Fm, and rapid light curves. Tissue samples were taken to measure diatom and chlorophyll abundance. Using this information, we will measure responses of C. lamellata to increases in light, heat, and a combination of stressors. Understanding the drivers of bleaching of this ecologically important sponge will inform predictions of broader impacts to sponges in future MHWs.

Climate change risk assessment of significant coastal marine habitats around the Wellington Region

Cook K[1], O'Mahony S[1], Melidonis M[1], Oliver M[1]

[1]Greater Wellington Regional Council

Marine habitats around Aotearoa are impacted by climate change, with extreme weather events such as storms and heatwaves forecast to become more frequent. High energy waves, heavy rain and storm surges can physically damage coastal and nearshore habitats with the potential for direct erosion, inundation, and sediment deposition. Increased water temperatures through long-term warming and marine heatwaves can exceed species' thermal tolerances causing mortality and facilitate range shifts of invasive and generalist species which outcompete resident species. Such climate change impacts are species, habitat and location specific, presenting a challenge to develop appropriate management actions.

This poster presents a climate change risk assessment (CCRA) for significant coastal marine habitats around the Wellington Region. We adapted methodology from existing regional and national CCRAs for marine species and habitats. Habitats were scored low, medium or high risk for eight sensitivity, two adaptive capacity and two exposure metrics such as temperature tolerance and exposure to sea level rise. Risk scores were summed to give an overall CCRA score, with an associated 'level of confidence' assigned considering the availability of existing knowledge. Using a repeatable methodology to identify significant habitats with high climate-associated risks can help inform the development of regional coastal management strategies.

The influence of the Drygalski Ice Tongue and Ice Shelf Water on ocean processes in Terra Nova Bay

Cornelissen L[1],[2],8, Stevens C[1],[2], McInerney J[1], Lucà N[3],[4], Castagno P[5], Yoon S[6], Choi H[6], Zappa C[7], Bowen [2]

[1]Earth Sciences NZ, [2]University of Auckland, [3]Universita Ca' Foscari Venezia, [4]Universita degli Studi di Napoli 'Parthenope', [5]Universita degli Studi di Messina, [6]Kyungpook National University, [7]Lamont Doherty Earth Observatory of Columbia University, 8University of Otago

The Drygalski Ice Tongue (DIT), the floating extension of the David Glacier, is a key feature of Terra Nova Bay (TNB) in the western Ross Sea, Antarctica. The ice tongue blocks the import of sea ice from the south, enabling polynya activity in TNB. Despite its limited spatial extent, in a global context, TNB polynya is a significant contributor to High Salinity Shelf Water (HSSW) production, a precursor to Antarctic Bottom Water, and sea ice formation. Here we use a decade-long hydrographic mooring time series to examine polynya operation in the region.The seasonal cycle and interannual variability of water masses near the DIT are evident, but transient anomalies are associated with the presence of Ice Shelf Water. A stepwise salinity increase is associated with near-bottom cooling, influencing long-term salinity variability across the bay. This signal is present during 2015–2017, when regional salinity was increasing, and absent during 2018–2020, when the salinity trend reversed. We find this process operates at a bay-wide scale, linking local ice–ocean interactions to larger-scale water mass formation. Variability in Ice Shelf Water within polynya regions may influence export of HSSW across continental shelf and properties of Antarctic Bottom Water.

Improving How We Share Water Quality Information: Interactive Dashboards for Freshwater and Coastal Monitoring

Crawshaw J[1], Sanchez Medina R[1], Taikato V[1]

[1]Bay of Plenty Regional Council

Effective communication of environmental monitoring data is critical for informed decision making by practitioners, regulators, and the public. However, complex datasets and technical assessment frameworks can limit accessibility and understanding. This poster showcases two Shiny-App interactive web based tools—the Water Ecology Tool and the Bathing and Shellfish Water Quality Tool—as case studies in improving how freshwater and coastal water quality data are communicated.

Developed to support regional scale monitoring and reporting for the NPSFM, these tools translate large, multiyear datasets into clear, intuitive visualisations aligned with nationally recognised assessment frameworks. By integrating automated calculations, timeseries plots, spatial context, and threshold based classifications, the tools reduce reliance on static reports and technical interpretation. Users can explore trends, identify risks, and contextualise results at site, catchment, or regional scales, supporting transparent and timely communication.

These tools demonstrate how interactive dashboards can bridge the gap between scientific analysis and practical understanding. They support consistent messaging across internal staff, stakeholders, iwi, and the wider community while retaining scientific rigour. The approach highlights how digital decision support tools can enhance trust, engagement, and clarity in environmental reporting, ultimately supporting better environmental outcomes.

Growing the Next Generation of Marine Detectives

Daly O[1]

[1]ECan

Effective science communication plays a vital role in empowering tamariki to understand and care for the marine environments that sustain Aotearoa. By creating engaging, hands-on opportunities for young learners to explore what inhabits their local coastlines, we help them build meaningful connections with the biodiversity that surrounds them in Canterbury. These early experiences foster curiosity, confidence, and a sense of kaitiakitanga, encouraging tamariki to see themselves as active participants in protecting te taiao.

Introducing tamariki to the incredible diversity of marine species alongside the threats posed by invasive and pest organisms helps them recognise how human actions shape the health of our moana. Through clear, accessible science communication, complex ideas such as biosecurity, ecosystem balance, and species identification become understandable and exciting. Tamariki learn to observe like marine detectives: noticing patterns, asking questions, and sharing their discoveries with whānau and community.

By weaving together mātauranga Māori, and playful exploration, we can nurture a generation of informed, engaged guardians who understand both the beauty and vulnerability of their local marine ecosystems. Investing in science communication for tamariki is ultimately an investment in the resilience of our coastal environments and the future kaitiaki who will protect them.

Developing sediment core chronologies to quantify accumulation rates and organic carbon burial in Fiordland marine basins

Gilmer G[1], Vandergoes M[2], Moy C[3], Riesselman C[3]

[1]Earth Sciences New Zealand, [2]Earth Sciences New Zealand, [3]University of Otago

Fjord basins are recognised as locations with high rates of organic carbon (OC) burial at the land-ocean interface. Quantifying OC burial rates in fjords requires robust sediment core chronologies to constrain sediment accumulation through time. In Fiordland, heterogeneous climate, environmental conditions, and sedimentary processes drive spatial and temporal variability in sediment accumulation.

To quantify sediment accumulation in multiple fjord basins influenced by different drivers, we analysed samples from different sediment core types collected throughout Fiordland. High-resolution chronologies were developed for each target basin using a combination of lead and caesium isotopes and radiocarbon analyses.

Developing core chronologies in highly dynamic marine environments like Fiordland is complicated by bioturbation, mass-event deposits, and the scarcity of chronological tie points (e.g. tephra layers or pollen). We addressed these challenges by integrating multiple dating techniques within Bayesian age–depth models.

Results indicate consistently high sediment accumulation rates (0.1 – 1 cm/year) across all fjord basins. In fjords with multiple basins, inner and outer basins have higher accumulation rates than middle basins.

This research demonstrates the strength of integrating multiple dating techniques to robustly constrain sediment accumulation rates and should be considered for application in other dynamic marine settings.

From canopy to current: tracking the journey and chemical evolution of kelp detritus

Grosvenor C[1]

[1]University Of Otago

Kelp detritus provides a substantial source of organic material to coastal species. Despite its recognised ecological importance, the interaction between detritus degradation and transport dynamics has not been investigated in an ecological context. These processes likely determine how, where, and in what condition kelp material arrives in recipient habitats.

The study investigates interactions between Ecklonia radiata detritus in the eastern Bay of Plenty (BoP), and coastal fauna. Isotopic analyses will be used to quantify the contribution of kelp-derived material to common consumer species: kina (Evechinus chloroticus) and green-lipped shell mussel (Perna canaliculus) along a gradient of catchment health. Feeding experiments are being conducted, alongside measurements of phlorotannin degradation, to understand how biochemical changes in kelp detritus affects consumption rates by consumers. Finally, particle tracking simulations are used to map the movement of kelp detritus and explain patterns observed in the experimental and isotopic data.

Pilot trials of both the feeding experiment and particle tracking simulations have been completed. In the first feeding trial, kina showed a preference for fresh E. radiata detritus over degraded detritus. Trial particle simulations of the movement of E. radiata detritus across the BoP region showed a significant amount of connection of material across the coastline.

Initial insights into under-ice fish assemblages near Adélie penguin breeding colonies from eDNA metabarcoding in Lützow-Holm Bay, East Antarctica

Kawai K[1], Ichikawa K[2], Kuroda M[3], Matsuda T[4], Hasegawa K[5], Takamatsu A[6], Kuroda M[7], Asai S[6], Onishi Y[1], Mitamura H[2], Takahashi A8, Miyamoto Y[6]

[1]Hiroshima University, [2]Kyoto University, [3]Japan Agency for Marine-Earth Science and Technology (JAMSTEC), [4]Port of Nagoya Public Aquarium, Nagoya Port Foundation, [5]Hokkaido University, [6]Tokyo University of Marine Science and Technology (TUMSAT), [7]Kyusyu University, 8National Institute of Polar Research

Coastal sea ice is a key feature of Antarctic coastal ecosystems, yet under-ice fish assemblages remain poorly documented because conventional sampling methods, such as trawling and underwater observations by divers, are often difficult or impossible in sea-ice-covered areas. Environmental DNA (eDNA) metabarcoding offers a non-invasive approach for characterizing fish assemblages in such environments. We used MiFish metabarcoding to provide initial insights into under-ice fish assemblages in Lützow-Holm Bay, East Antarctica, and to compare fish eDNA signals between sites near Adélie penguin Pygoscelis adeliae breeding colonies and nearby control sites.

A total of eight fish species were detected, all belonging to the nototheniid fishes (Nototheniidae, Perciformes), which dominate the coastal Southern Ocean fish fauna. MiFish reads assigned to Antarctic fishes tended to be markedly lower at sites near Adélie penguin breeding colonies than at control sites. In particular, near the Adélie penguin breeding colony at Langhovde, no Antarctic fish-derived eDNA reads were recovered on any of the survey dates. The low recovery of Antarctic fish eDNA reads near breeding colonies during the chick-rearing period may reflect local scarcity of nototheniid fishes, potentially associated with penguin predation pressure.

Anthropogenic impacts on the reproduction of the southern rock lobster (Jasus edwardsii)

Langley M[1]

[1]University Of Otago

The southern rock lobster (Jasus edwardsii) is a species of significant ecological, cultural and commercial importance in Aotearoa. This research will investigate how anthropogenic impacts, specifically climate change and fishing pressure influence J. edwardsii reproduction and aims to develop an artificial egg rearing method that could help alleviate associated impacts.

A laboratory study will examine the effects of marine heatwaves on the survival, development, and swimming ability of J. edwardsii larvae. As an ectotherm, J. edwardsii is particularly vulnerable to climate-driven warming. With marine heatwaves projected to become more intense, frequent and prolonged under climate change, understanding their effects on early life stages is critical.

A field study will investigate the relationship between maternal size, egg size, and egg lipid and protein content in J. edwardsii populations around Otago. As one of Aotearoa's most economically valuable fisheries, J. edwardsii faces considerable fishing pressure and size at maturity around Otago has declined. This study will provide baseline egg quality data for the region while exploring how shifts in maternal size could influence broader population dynamics.

Finally, an experiment will test three artificial incubation methods for J. edwardsii, with potential applications in aquaculture, reseeding, and improving ethical standards for lobster research.

Comparing abundance and presence-absence models of fish species: ecological factors underpinning their accuracy and validity

Leunissen E[1], Hayden M[2], Bennion M[2], Cook K[3], Lundquist C[4], Brough T[1]

[1]Earth Sciences New Zealand, [2]Earth Sciences New Zealand, [3]Greater Wellington Council, [4]Central Queensland University Gladstone

Species distribution models (SDMs) are widely used to inform marine spatial planning, but most rely on presence-only or presence-absence data rather than abundance information. Whether presence-based models can reliably proxy species abundance remains poorly understood, particularly across a broad range of taxa. Using fisheries data for 97 New Zealand fish species, we compared predictions from presence-absence and abundance-based SDMs to assess how well occurrence models proxy species abundance. Correlations between model outputs varied considerably across species, and we used a generalised linear mixed model (GLMM) to investigate whether ecological traits (including species range extent, habitat specialisation, patch size and distribution, taxonomy, and niche breadth) could explain this variation. Results suggest that species with narrower ecological niches, more contiguous distributions, and larger mean patch sizes produce presence-absence models that more reliably proxy abundance, and that lower model uncertainty is positively associated with higher abundance-suitability correlation. These findings indicate that ecological characteristics and model uncertainty metrics can serve as practical indicators of model reliability.

The role of temperate sponge-associated microbiomes in enhancing sponge holobiont acclimation to marine heatwaves

Maldeniya U[1], Strano F[1,2], Davy S[1], Thomas T[3,4], Bell J[1]

[1]School of Biological Sciences, Victoria University of Wellington, [2]Earth Sciences New Zealand, Private Bag [14]90[1], [3]Centre for Marine Science and Innovation, University of New South Wales, [4]School of Biological, Earth and Environmental Sciences, University of New South Wales

Marine heatwaves (MHWs) are increasing in frequency, intensity and duration under climate change, threatening marine ecosystems, particularly temperate benthic communities. Sponges are key ecosystem engineers on temperate reefs, yet recent MHWs reveal strong interspecific differences in thermal tolerance, highlighting gaps in our understanding of their resilience. Earlier evidence suggests that sponge-associated microbiomes play a central role in stress tolerance, potentially enabling rapid acclimation through microbial reorganisation. My study investigates how sponge microbiomes contribute to holobiont acclimation during repeated MHW exposure. Temperate sponge species common to New Zealand coasts (Crella incrustans, Tethya bergquistae, Tethya burtoni, Suberites australiensis, Aaptos globosum, Darwinella oxeata) are being assessed under controlled laboratory MHW simulation with an initial 42-day MHW, followed by an eight-week recovery period and a subsequent, more intense heatwave. Host responses will be assessed alongside microbial community shifts across both events to determine whether changes induced by the first heatwave enhance tolerance to subsequent thermal stress. High-throughput 16S rRNA sequencing, metagenomics and metabolic modelling will identify microbial taxa, functional pathways and interactions linked to thermal tolerance. By connecting microbial dynamics with host performance, this study will reveal microbiome-mediated stress memory clarify mechanisms of acclimation and improve predictions of sponge resilience under future ocean warming.

Spatiotemporal variation in the distribution of Hector's dolphin (Cephalorhynchus hectori) nursery groups at Banks Peninsula, New Zealand

Parker A[1], Bennington S[2], Dawson S[1], Slooten E[1], Rayment W[1]

[1]Department of Marine Science, University Of Otago, [2]Earth Sciences New Zealand

Understanding the distribution of species is critical for forming management plans. Because the needs of individuals vary among age and sex classes, habitat use often differs among members of the same population. For example, female cetaceans often shift their distribution towards shallower "nursery areas" when they are nursing a calf to gain protection and access to food. As the survival of reproductive females is critical for population growth, nursery areas are often identified as priorities for protection and conservation. In this study, we leveraged 30 years of data from standardized, vessel-based, photo-identification surveys to identify core areas of distribution for Hector's dolphin (Cephalorhynchus hectori) nursery groups around Banks Peninsula, New Zealand. Core distribution areas were identified using kernel density estimation across 1,135 surveys from 1995 to 2026, and for five-year intervals within this period, during the calving season (December to March). Further studies will use environmental predictor variables including prey distribution, swell, and depth to create species distribution models. The outputs can be used to develop targeted conservation measures and predict how habitat use may shift in the future.

Subtidal Seagrass Mapping in Bluff Harbour: a survey of current distribution and depth extent of the seagrass Zostera muelleri

Stephanie Shaw[1], Dr Anna Palliser[1], Bryony Miller[2]
[1]Southern Institute of Technology (SIT)
[2] e3 Scientific

Seagrass meadows are uniquely important marine ecosystems which are in decline in many parts of the world including Aotearoa. Mapping seagrass and understanding factors impacting it is an important first step in its management. Zostera muelleri is New Zealand's only seagrass species and is present in Bluff harbour. Prior to this study, subtidal seagrass in Bluff Harbour had not been mapped for 20 years.
The current extent of and depth extent of subtidal seagrass in Bluff Harbour was determined along with the presence of nuisance macroalgae. Depth, temperature and water clarity readings were taken. A map was produced in ArcGIS Pro to display the results and compare against previous mapping. The research was conducted via on-boat observation of seagrass beds in tandem with aerial imagery, to ground-truth the imagery. Photographs of the beds were taken with a drop-camera rig.
Aerial imagery was investigated and was found to be accurate and detailed enough to guide digital map creation.
The total area mapped equalled 394.05 hectares, representing an increase in extent since its last mapping. The maximum depth of seagrass measured was 1.48m below MLWS. Epiphytic and benthic brown algae species pose a possible future threat to the seagrass in some areas.

Mapping benthic habitats on a fringing reef in the Solomon Islands

Stockley A[1], Breen D, Hinchliffe G, Martin G, Sabetian A

[1]Auckland Uniersity Of Technology

Fringing reefs across the Pacific are increasingly threatened by land-use change, sedimentation, overfishing, and climate stress, yet fine-scale spatial data remain limited in many regions. This study examined environmental drivers of benthic habitat composition on the fringing reef at Vavanga Village, Kolombangara Island, Solomon Islands. Drone imagery and underwater video surveys were used to georeference approximately 4,000 reef images, which were classified into benthic taxa and substrate categories. Spatial interpolation and classification and regression tree analysis were used to assess relationships between habitat patterns, distance offshore, and proximity to freshwater inputs. Clear spatial zonation was identified across the reef flat, with benthic communities varying in relation to reef crest position, river influence, and nearshore sediment dynamics. Areas exposed to freshwater runoff and sediment plumes showed distinct habitat composition compared with more seaward reef zones, where coral cover generally increased. These findings demonstrate the value of integrating UAV and underwater imagery with spatial analysis to assess reef heterogeneity at local scales and provide baseline information to support reef management in the Solomon Islands and similar Pacific environments.

Habitat use of different age and sex classes of bottlenose dolphins (Tursiops truncatus) in Fiordland, New Zealand

Williams E[1], Bennington S[1], Corne C[1], Dawson S[1], Johnson D[2], Rayment W[1]

[1]Department of Marine Science, University Of Otago, [2]Department of Conservation

Variability in space use of different demographic groups can limit the effectiveness of management plans for endangered species. In marine mammals, demographic groups (e.g., age and sex classes) often utilise space differently due to specific behavioural and environmental requirements. The subpopulations of Fiordland bottlenose dolphin (Tursiops truncatus) are critically endangered due to low population size (~60 in Doubtful Sound and ~120 in Dusky Sound) and geographic isolation, being at the most southern point of the species' global range. Systematic distribution and photo-ID surveys were conducted in Doubtful Sound (n=87) and Dusky Sound (n=57) between 2004 and 2025. Age of individual dolphins was inferred from capture histories, with three classes designated: newborns (<1 year), calves (<3 years), and adults (>3 years). Sex was ascertained by direct observation of the genital slit or by consistent association with a calf. We used Kernel density estimation to identify core habitat areas for each demographic class and determined the overlap of these areas. These findings indicate areas that could be targeted for spatial management plans throughout Fiordland, so that protection is maximised for vulnerable demographics.

Gut Microbiome Dysbiosis in Live-Stranded vs Bycaught Common Dolphins (Delphinus delphis)

Zaiko N[1],[2], Scriver M[2], Stockin K[1], Betty E[1]

[1]Massey University, [2]Sequench Ltd.

In Aotearoa New Zealand, understanding marine mammal health and behavioural factors, particularly in relation to strandings, remains a significant conservation challenge. This is especially true for the common dolphin (Delphinus delphis), where limited taxonomic resolution and underrepresentation in species-specific studies limit evidence-based management. Gut microbiotas are increasingly recognised as indicators of host physiological condition, health status, and exposure to environmental and dietary stressors. This study aims to characterise the gut microbiome of bycaught and stranded common dolphins to establish a species-specific baseline. Stomach and intestinal samples from individuals of differing sex and sexual maturity will be analysed using bacterial 16S rRNA amplicon sequencing to determine microbial community composition. Analyses will assess variation associated with sex and sexual maturity, quantifying intrinsic sources of microbiome variation. Functional inference will be used to predict microbial metabolic potential and its relationship to host condition. Microbial data will be integrated with dietary analyses to contextualise variation in relation to foraging ecology and dietary plasticity. This study would be the first to examine the gut microbiome of any dolphin in Oceania New Zealand waters, establishing the initial baseline for health monitoring and supporting the conservation management of this understudied species.

ATTENDEE LIST

(EXCLUDING PRIVACY REQUESTS)
CORRECT AS AT 26TH JUNE 2026

First Name	Last Name	Organization
Yasmine	**Ahlman**	*Victoria University Of Wellington*
Henry	**Allard**	*Nelson City Council*
Patricio	**Ávila-Guerrero**	*Universidad Santo Tomás*
Chris	**Battershill**	*University Of Waikato*
Erin	**Bell**	*Bioeconomy Science Institute*
James	**Bell**	*Victoria University Of Wellington*
Emilee	**Benjamin**	*The University Of Auckland*
Della	**Bennet**	*Wildland Consultants Ltd*
Jerusha	**Bennett**	*University of Otago*
Steph	**Bennington**	*Earth Sciences New Zealand*
Matt	**Bennion**	*Earth Sciences New Zealand*
Pippa	**Benton**	*University Of Auckland*
Jemma	**Bezuidenhout**	*University Of Otago*
Felix	**Borrowdale**	*University Of Otago*
Corey	**Bragg**	*Tohu Environmental*
Daniel	**Breen**	*Auckland University Of Technology*
Vera	**Bronza**	*Boxfish Robotics*
Tom	**Brough**	*Earth Sciences Nz*
Ron	**Bull**	*Ōraka-aparima*
Melanie	**Burns**	*Environment Canterbury*
Lucy	**Campbell**	*Te Herenga Waka - Victoria University Of Wellington*
Emma	**Carlé**	*Ōraka-aparima*
Dr. Xinglong	**Chang**	*Boxfish Robotics Limited*
Martyn	**Chew**	*BOP Regional Council*
Dana	**Clark**	*Cawthron Institute*
Samuel	**Clough**	*Auckland University Of Technology*
Matteo	**Collina**	*Victoria University Of Wellington*
Katie	**Cook**	*Greater Wellington*
Liv	**Cornelissen**	*University Of Otago, Earth Sciences Nz, University Of Auckland*
Josie	**Crawshaw**	*Bay of Plenty Regional Council*
Vonda	**Cummings**	*Earth Sciences New Zealand*
Oonagh	**Daly**	*ECan*
Jean	**Davis**	*Fisheries New Zealand*
Toby	**Dickson**	*University Of Auckland*
Nadia	**Dikareva**	*Auckland Council*
Emily	**Douglas**	*Earth Sciences New Zealand*
Alison	**Duncan**	*Ministry For The Environment*
Brendon	**Dunphy**	*Waipapa Taumata Rau/the University Of Auckland*
Kerri-Anne	**Edge**	*Edge*

Ursula	**Ellenberg**	*Department of Marine Science, University of Otago*
Susana	**Enriquez**	*MPI-AHL*
Tyler	**Feary**	*University of Auckland/Cawthron Institute*
Daniel	**Field**	*Kernohan Engineering*
Luka	**Finn**	*Hokonui Rūnanga*
Katrina	**Fletcher**	*Bioeconomy Science Institute*
Alana	**French**	*University Of Otago, Ōtākou Whakaihu Waka*
Malindi	**Gammon**	*Cawthron Institute*
Shane	**Geange**	*Department Of Conservation*
Shawn	**Gerrity**	*University of Canterbury*
Greer	**Gilmer**	*Earth Sciences Nz*
Katrina	**Goddard**	*Northtec (tai Tokerau Wānanga)*
Barbara	**Graham**	*Victoria University Of Wellington*
Caitlin	**Grosvenor**	*University Of Otago*
Eva-Maria	**Hanninger**	*Cetacean Ecology Research Group, School Of Natural Sciences, Massey University*
Melanie	**Hayden**	*Earth Sciences NZ*
Ash	**Heaphy**	*University Of Auckland*
Dan	**Henderson**	*Kelly Tarlton's Marine Wildlife Trust*
Robert	**Hickman**	*Retired*
Kotaro	**Ichikawa**	*Kyoto University*
Emily	**Jones**	*SLR Consulting Limited*
Kentaro	**Kawai**	*Hiroshima University*
Amber	**Kirk**	*Victoria University Of Wellington*
Dr Jane	**Kitson**	*Tohu Environmental*
Orlando	**Lam-Gordillo**	*Earth Sciences New Zealand*
Mia	**Langley**	*University Of Otago*
Eva	**Leunissen**	*Earth Sciences New Zealand*
Rob	**Lewis**	*University Of Otago*
Katie	**Littlewood**	*Marlborough District Council*
Drew	**Lohrer**	*Earth Sciences New Zealand*
Kevin	**Mackay**	*Earth Sciences New Zealand*
Anna	**Madarasz-Smith**	*PDP*
Rob	**Major**	*The Nature Conservany*
Usangi	**Maldeniya**	*School of Biological Sciences, Victoria University of Wellington*
Alice	**McCullough**	*BLAKE*
Rebecca	**Mcleod**	*Otago Regional Council*
Anna	**Meissner**	*Environment Southland*
Megan	**Melidonis**	*Greater Wellington Regional Council*
Hannah	**Melzer**	*University Of Otago*
Irene	**Middleton**	*Biosecurity New Zealand*
Bryony	**Miller**	*E3scientific Ltd*
Damian	**Moran**	*Bioeconomy Science Institute*
Christopher	**Moy**	*University Of Otago*
Hayley	**Nessia**	*Kelly Tarlton's Marine Wildlife Trust*
Monica	**Nevill-Jackson**	*Northland Regional Council*

Altan	**Ní Mhurchú**	*University of Auckland & Earth Sciences New Zealand*
Riki	**Nicholas**	*Hokonui Rūnanga*
Scott	**Nodder**	*Earth Sciences NZ (NIWA Business Unit)*
Sorrel	**O'Connell-Milne**	*The University of Otago & Salt Ecology*
Megan	**Oliver**	*Greater Wellington Regional Council*
Seamus	**O'Mahony**	*Greater Wellington Regional Council*
Anna	**Palliser**	*Southern Institute of Technology*
Riki	**Parata**	*Hokonui Rūnanga*
Abigail	**Parker**	*University Of Otago*
Kylie	**Pedersen**	*MPI*
Grady	**Petersen**	*Earth Sciences New Zealand*
Kasmira	**Peterson**	*Ōraka-aparima*
Dave	**Pickering**	*Waikato Regional Council*
Miriam	**Pierotti**	*Victoria University Of Wellington*
Matthew	**Pinkerton**	*Earth Sciences New Zealand*
Rata	**Pryor Rodgers**	*Tohu Environmental*
Zoe	**Qu**	*Earth Sciences New Zealand*
Ash	**Rabel**	*Environment Southland*
Will	**Rayment**	*University Of Otago*
Howard	**Reti**	*Mohimohi Moana Foundation*
Emma	**Richardson**	*Discovery Through Nature Ltd*
Kirsten	**Rodgers**	*Department of Conservation*
Leslie	**Sampollo**	*University Of Auckland*
Rigoberto	**Sanchez-medina**	*Boprc*
Kathryn	**Scafidi**	*University of Otago*
David	**Schiel**	*Canterbury University*
Kareen	**Schnabel**	*Earth Sciences New Zealand*
Gemma	**Scott**	*PDP*
Michelle	**Scriver**	*Sequench Ltd.*
Jenni	**Stanley**	*University of Waikato*
Aidan	**Stockley**	*Auckland Uniersity Of Technology*
Vanessa	**Taikato**	*Bay of Plenty Regional Council*
Leigh	**Tait**	*Earth Sciences NZ*
Pierre	**Tellier**	*MCERT*
Sam	**Thomas**	*Otago Regional Council*
Tessa	**Thomson**	*Earth Sciences New Zealand*
Di	**Tracey**	*Earth Sciences*
Ben	**Tuckey**	*DHI*
Aimee	**Van Der Reis**	*University Of Auckland*
Anne Fleur	**van Leeuwen**	*University Of Auckland*
Spencer	**Virgin**	*University Of Canterbury*
Ulla	**von Ammon**	*Cawthron*
Oliver	**Wade**	*Marlborough District Council*
Zayne	**Waitiri**	*Hokonui Rūnanga*
Ceara	**Wallace**	*Northland Regional Council*
Sophia	**White**	*Ministry For Primary Industries*

Emily	**Williams**	*University Of Otago*
Andy	**Wills**	*Bay Of Plenty Regional Council*
Pete	**Wilson**	*SLR Consulting*
Karen	**Wilson**	*Environment Southland*
Kea	**Witting**	*Victoria University Wellington*
Gabriela	**Wood**	*Victoria University Coastal Ecology Laboratory*
Inigo	**Zabarte-Maeztu**	*Earth Sciences New Zealand (ESNZ)*
Nelli	**Zaiko**	*Sequench, Massey University*
John	**Zeldis**	*Earth Sciences NZ*