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My life-time love affair with the sea

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Introduction

The colors of deep navy and silver that stretch together to the horizon across the sea still take my breath away. They remind me of just how fortunate I am to have had a life-long career doing what I love best. That is, exploring the unfathomable and mysterious ocean.

How it all began

It all began when as a young girl growing up in the 1960s in the United Kingdom (UK) I first realized that I always felt at my best when I could see, hear, smell and feel the sea nearby. The mystery in her song inspired me; I was drawn to the hustle and bustle of ports; the romance of going to sea on a ship beguiled me and by the age of 10, I was trying to find out from the UK's Institute of Oceanography, which happened to be next door to my school, how I could end up with a job on the "ocean blue."

Options at the time included joining the navy, studying oceanography or perhaps meteorology, but opportunities for women did not abound. However, luck was on my side as there was growing public interest in the sea, and the disciplines of marine biology, oceanography and geology were on the rise (Robinson, 2018). Academic accessibility was also increasing, so rather than deter me, my teachers encouraged me to follow my passion even though science was largely a male domain. How lucky was I. By the time I completed my Zoology Honors degree in 1971, women were moving into the so-called "soft sciences" in droves. After completing an MSc in Oceanography, I took up a PhD scholarship in Aotearoa New Zealand to study flatfish in the region that was to become my permanent home.

During my doctorate years in New Zealand, it became clear to me that fisheries research could potentially provide me with a gateway into a lifelong career in marine science. New Zealand declared its 200 mile Exclusive Economic Zone (EEZ) in 1978, and suddenly fisheries scientists were scrambling to assess the extent of offshore fish resources in the region. Marine science job opportunities expanded, and employers were keen to take on women like me. It was an era when biological knowledge about fish was still held in high esteem and an exciting time to look for work. In 1985 I was appointed as a government research scientist to work on the deepwater fish species hoki (*Macruronus novaezelandiae*), a merluccid hake that was to become New Zealand's largest fishery (Fisheries New Zealand, 2024a).

We had a small research vessel, R.V. "James Cook" that was really quite unsuitable for New Zealand's offshore waters, so we made do with chartering large research and commercial fishing vessels from other nations that were already legitimately fishing as joint ventures in our offshore zone. Cultural and language barriers added to the challenges that we all faced at sea (men and women) but often as not, the women were better at appeasing the foreign skippers than our male colleagues. By this I mean we demonstrated considerably higher emotional intelligence or "EQ" which helped to smooth the pathway for successful surveys and robust data collection while on board.

Survey work at-sea was our bread and butter as scientists, and although routine, we were still exploring the fish potential of our EEZ. Strange and new species were regularly found, and there was ample scope for taxonomic and genetic studies to be conducted alongside the assessment surveys. Exciting discoveries were made, such as an abundance of fish (e.g., orange roughy), at great depths that lived to 100 years plus (Mace et al., 1990). We also found that many of our deepwater species did not spawn every year; another unexpected result (Livingston and Bull, 2000). Feeding studies and trophic modeling began to point to fairly low productivity in our waters (Bradford-Grieve and Livingston, 2011), and more caution was introduced into the models that were used for stock assessment. There was still much to learn.

A major change during my early career included the introduction of New Zealand's Quota Management System (QMS) in 1986 (Mace et al., 2014). Much has been written about it from both positive and negative viewpoints, but the legislation had been negotiated among all parties and was deemed to be a science-based way of assessing fish stocks that would lead to sustainable fishing and quota ownership for fishers (Fisheries New Zealand, 2024a).

Barriers to success

At sea and in the field, women scientists entered the world of men in New Zealand. We were teased and tested mercilessly by some of the crew and had to learn to stand our ground. In the early days, the ships were not equipped for women's needs particularly when it came to shared bathroom facilities or uniquely female challenges such as menstruation, but stand our ground we did. Similar challenges were experienced by women involved in coastal work (Hamylton et al., 2023; Department of Conservation, 2022) and female observers at sea on fishing vessels (Schmidt-McCleave, 2020). On almost every survey, there would be at least two women on the science team, and we supported each other fervently. Again, how lucky I was.

Gender related barriers to career development were widespread among work colleagues back on land. It was still a very male-dominated work environment and an arrogant air seemed to permeate among some of the scientists. I am sure it was not intentional, and indeed there were some managers who were very sensitive to encouraging women scientists to succeed along with their male counterparts. But there were some unspoken barriers among colleagues around our physical robustness for fieldwork, our prowess in mathematics, and perceived social threats to male camaraderie by sending female scientists into the field with them. We had to work hard at getting the balance right and manage those perceptions.

In the 1990s, New Zealand's science system was significantly restructured, and research science was split off from policy and management in a newly formed Ministry of Fisheries in 1995. We researchers were merged into NIWA, and became part of a Crown Research Institute with a much broader marine science mandate than just fisheries.

My new employers were highly supportive regarding career opportunities for women, and when I decided to have a family, I was given a full range of choices regarding my science position, which they kept open for me for a year. Because so many of us were having children, they even built an on-site childcare center for

us to use—all part of the Equal Employment Opportunity focus of the times. I opted to work part-time when my children were small, and because of that, I did not go to sea very much, and I suspect that my career progress slowed during that period. Juggling family commitments with career commitments was hard, and the lack of visibility at work did not help. When I finally returned to work full-time, things dramatically improved. In retrospect, any biases I think revolved around being a part-timer rather than being female *per se*. I do believe that help with transitioning back into professional work could be very helpful to women who are out of the workforce for extended periods.

There have been many studies to show that women scientist's salaries lag behind those of their male counterparts and although it has improved, there is still room for improvement (OECD, 2022; Gardner et al., 2020). However, it was difficult to find out what others were paid as it was private information that remained undisclosed, so, I largely ignored it. I found that I had to conserve my energy for the work at hand rather than particular battle.

A change in direction

After my first 10 years or so as a fisheries scientist, interest in the environmental effects of fishing began to grow worldwide. My own interest in this also developed as did my concern about the effects of climate change and ocean acidification on fisheries productivity. I became heavily involved in the Marine Stewardship Council certification for the hoki fishery and saw the environmental compliance required as a step forwards for industry and management (Marine Stewardship Council, 2001). It seemed to me that the government had not forecast the extent of global concern for the environment and the international spotlight it would bring to the long-term sustainability practices of New Zealand's Fisheries and continued to twist and turn trying to make it seem like fisheries were environmentally managed, when in fact there was much more that could be done.

I decided to move from my active research role in NIWA into science management in the Ministry of Fisheries. This move expanded my scientific remit, leading me to a much greater understanding of the links between policy, management and science advice. It was an exciting time for marine research as the newly launched Biodiversity Strategy (Department of Conservation and Ministry for the Environment, 2022) brought some research money into Fisheries that enabled the first steps toward understanding the environmental context in which fisheries operated. Typical questions included: how diverse were the ecosystems of our seas? What was happening with regards to climate change effects? How was ecosystem function affected by fishing activity?

Across government, mapping biodiversity in the ocean environment became a priority and helped us to identify areas of vulnerability that needed protection from fishing (e.g., Brodie and Clark, 2003; Mace et al., 2014; Cryer et al., 2016; Fisheries New Zealand, 2024b; Department of Conservation, 2020). The fisheries research surveys were mandated to collect a broader suite of environmental data, and joint Government agency programmes were developed to ensure that baseline data was collected. This second stage of my career was exhilarating and I did not feel discriminated against in any way. There was a will to



FIGURE 1
The author in front of R.V. *Tangaroa* about to embark on a voyage to Antarctica in 2006.

collectively work on thorny issues about our oceans, and there was significant support for programmes that would improve our base understanding of the marine ecosystem. I was invited to represent the Ministry of Fisheries onboard a multidisciplinary survey of Antarctica (Figure 1). Unfortunately this was not sustained. The financial crisis of 2008 led to huge budget cuts in science, significant restructuring across government departments and nearly all cross departmental funding was withdrawn. The changes had a huge impact on our ability to network across government and continue the programmes on marine data collection. For me personally, this became a dark era. The Ministry of Fisheries was folded in under the Ministry for Primary Industries and lost its autonomy. As individuals, we also lost our workplace autonomy and were coerced into a highly regimented authoritarian operational model that I found very challenging to thrive in. The barriers to career progression for women seem to rear larger once more.

In 2014, the National Science Challenges were launched and “Our Sustainable Seas” was hailed as being the way forwards for improving ecosystem based management in the marine environment. Yet in the early years, fisheries scientists were virtually excluded from the Challenge. By 2020 this had changed, and fisheries became a clearer component of Sustainable Seas.

At the time of writing, funding for fisheries related environmental research has continued to shrink significantly, and has to compete with stock assessment, which has also shrunk.

Funding for monitoring fishstocks and fisheries management is largely cost recovered from the seafood industry (Government of New Zealand, 2025). Funding to monitor the effects of fishing on the environment is however less clear cut, and argument over how much of the research is for public good rather than fisheries management is often quite heated. Controversy also arises over Iwi relationships with the Crown, and again, funding for Iwi priorities has to compete with other research funding. Progress on the longed-for co-governance model of Iwi and the Crown for fisheries management remains slow to develop (Sustainable Seas, 2024a; Rout et al., 2024).

The struggle for science positions everywhere has become highly competitive as funding has reduced and cutbacks to government departments have been implemented (Meier, 2024). The turnover rate in science staff is far higher than it used to be, making it difficult for women to compete, particularly when they are raising young families. It seems that women are still paid less than men for equivalent work in fisheries science, and that the number of women in senior positions remains small.

To sum up my career in fisheries science

I have been fully stretched during my career, both as a scientist and as a human being. The kind of background that I had in my

biological degrees served me well in my career, and took me to many parts of the world, including Alaska, Antarctica and Europe. However, I think that as fisheries management moves forwards with ever increasing complexity, the next generation of lovers of the sea will need to be better equipped in the mathematical, societal and economic areas of systems thinking and brokering a political philosophy of working together than I was exposed to [Lawrence et al. \(2023\)](#).

There have been many in depth reviews and strategies published that provide a sound basis for the collaborative future of fisheries research and management in New Zealand (e.g., [Clark, 2025](#); [Aotearoa Circle New Zealand, 2021](#); [Sustainable Seas, 2024b](#); [Bax et al., 2022](#); [Jacobs, Environmental Accounting Services, Anderson Lloyd, Nature Conservation, 2024](#); [Lawrence et al., 2023](#); [Ministry for the Environment, 2022](#); [Office of the Prime Minister's Chief Science Adviser., 2020](#)). There are so many unifying views across the sector on how fisheries management could be improved and it is up to the next generation of scientists to take this forward. If the marine or “blue” economy is to expand, new and greater investment will be required to obtain the broader information base needed. Here's hoping there is a will to work collectively on progressing the fisheries issues across government.

I have enjoyed my career as a marine scientist and my love of the sea has not faded. I have made many friends during it, and as a woman I have been treated well. As a scientist, the treatment has been less rosy, and there is much room for improvement. Can we give more credence to a shared love of the sea as we move forwards into the blue economy? I sincerely hope so.

Ethics statement

Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

ML: Writing – original draft, Writing – review & editing.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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