



F.L.O.W. Collaborative
Fisheries.Livelihoods.Oceans.Well-being.



TERRA MOANA
natural capital know how

Ecosystem Services and Sustainable Seafood

An Introductory Briefing by Katherine Short. February 2015.

The Big Picture

Applying ecosystem services (ES) to seafood is new! Having spent over a decade working to grow the momentum for sustainable seafood globally, I began this learning journey in 2010 with my sponsored Masters studies at Imperial College, because I could see some of the stuck points in improving fisheries and livelihoods. Did sustainable seafood professionals want to do more, if so what, and could considering challenges through the lens of ecosystem services make any difference. This has been further developed in business practice with a large seafood company and is being released at the Seafood Summit, the leading gathering of sustainable seafood professionals, for testing and further development.

Ecosystem services help us address a number of fishing and ecosystem challenges potentially more effectively, or at least complimentary to other current approaches – ecosystem including people socially, culturally and economically. Our health and well-being depend upon the services provided by ecosystems and their components: water, soil, nutrients and biodiversity such as trees and fish. These are the stocks of natural capital that underpin human well-being through the services (clean water, air, food, materials) flowing from them..

The core innovations I have been exploring are:

1. linking natural capital and ecosystem services to improved seafood company understanding of their ecosystem impacts and dependencies of their operations,
2. more appropriate metrics, and;
3. greater corporate transparency - through using the Global Reporting and Integrated Reporting frameworks. (See combining three worlds pg 4).

In this briefing you'll find a description of the activities at the Seafood Summit, some handy URLs where you can learn more and a draft article that is InPress. If you would like to learn more, provide feedback, or discuss any of this please email katherine@terramoana.co.nz or call +64-22-108-3536. I look forward to co-evolving this with you!

Seafood Summit

Panel Session on Tuesday 1345-1515. Meeting Industry Information Needs for Sustainability. Science, Metrics, Financing and Communications.

Workshop, co-hosted with Future of Fish on Wednesday 0800-1100. Au Naturelle: Aligning Forces and Experience from Sustainable Business for Sustainable Seafood.

Find Out More

The links below point to some of the current application of ecosystem services to seafood. (N.B. Not exhaustive).

Aotearoa Fisheries Limited Ecosystem Service Review of New Zealand Abalone

- 2 Page Summary:
http://www.sbc.org.nz/_data/assets/pdf_file/0013/93100/Aotearoa-Fisheries-Ltd.pdf
- ~3 minute video of AFL CEO Carl Carrington:
<http://www.stuff.co.nz/business/industries/63857042/App-wanted-for-anglers-catch>
- Sustainability Strategy:
http://www.afl.maori.nz/documents/AFLSustainabilityStrategy281114_000.pdf
- Qualitative Ecosystem Service Review Compendium: to go online Monday!
Watch www.afl.maori.nz

Annabelle Bladon's PhD Research

- <http://www.iccs.org.uk/annabelle-bladon/>
- Fish and Fisheries Article on Marine Payment for Ecosystem Services in the Developing World <http://pubs.iied.org/X00127.html>
- Conservation Trust Funds in Fisheries <http://pubs.iied.org/16574IIED.html>

Sanford's Corporate Report using integrated and global reporting standards.

- <http://www.sanford.co.nz/sanfordfisheries/investor-information/en/company-reports.cfm>

Marine Ecosystems and Management recent ecosystem services article:

<http://depts.washington.edu/meam/MEAM38.pdf>

Dr Fiorenza Micheli – who will be a part of the workshop, has done some very useful work which may well be able to plug some of the current gaps for the seafood sector to have consistent metrics to measure.

<http://micheli.stanford.edu/pdf/A%20systemwide%20approach%20to%20supreporting.pdf>

Sharing the Benefits and Costs of Seafood Sustainability - An Illustrated Innovation and Learning Journey about Marine Fisheries, Seafood and Ecosystem Services.

By Katherine Short.

February 2015.

Do Not Copy. In press.

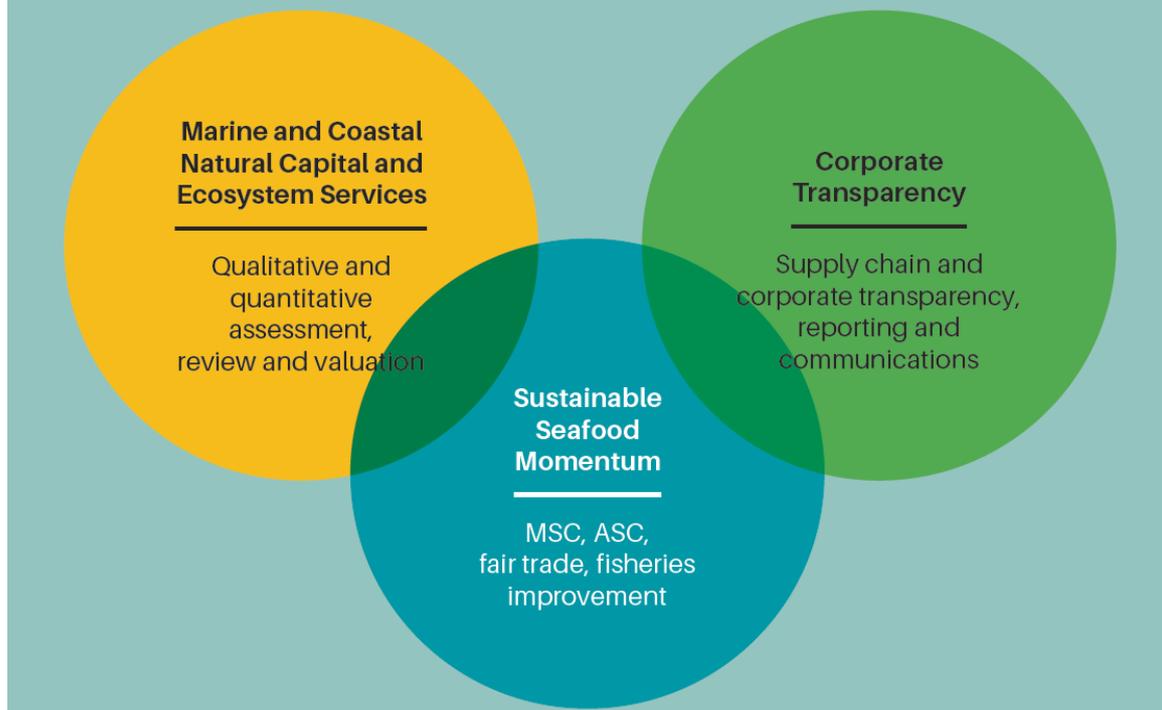
Oceans cover almost three-quarters of the planet, hold 97 per cent of its water, produce more than half of the oxygen in the atmosphere, and absorb the most carbon from it. We evolved from the oceans and they are crucial for life on planet ocean.

The marine environment is also where we work, trade and recreate. About 40 per cent of humanity lives within 100 kilometres of the coast and ocean-based businesses – from fisheries to tourism to energy generation and shipping – contribute more than \$500 billion to the global economy.

With increasing pressures and the degradation of many parts of the marine environment, including reduced fish and other species' populations, there is a growing awareness that more holistic approaches need to be taken to manage our impacts on the marine realm.

Since the famous, tumultuous and catastrophic crash of the Newfoundland cod fishery and its eventual closure in 1992, much progress has been made in developing and applying economic incentives to improve fisheries management. The most successful of these is the Marine Stewardship Council with now over 9 per cent of the total wild marine fisheries harvest certified. However, the MSC cannot deliver everything a sustainable fishery requires including habitat or social sustainability. It simply wasn't designed to do so.

The article describes academic and practical research to apply ecosystem services to marine fisheries and how this can empower the seafood sector to better manage fisheries and the habitats they depend upon, better understand the relevant social context, fill knowledge gaps to compliment certification and communicate more transparently. It brings together three worlds, of marine and coastal ecosystem services, corporate transparency and sustainable seafood. The author's background includes the development and implementation of marine policy and sustainable seafood programmes through various roles at WWF, in academic research and more recently in applied practice in private business.



Infographic 1 – Three worlds coming together: *Using ecosystem service analysis brings an ecological depth and can address both social and cultural issues. It also empowers businesses to take ownership and responsibility for their impact on the environment. It is an opportunity for corporate, public, and NGO entities to work together toward clear and achievable outcomes.*

Why is a New Approach Required?

Marine fisheries are in crisis internationally given overfishing, climate change and pollution amongst others. Management systems, such as New Zealand's Quota Management System, manage key aspects such as sustainable harvest levels, but they can also be fragmented, as well as receive insufficient government support to be effective at the scale of managing ocean health. Amongst other government responsibilities including health, education, transport, marine fisheries are simply not a high enough priority in most countries.

Fortunately there is growing awareness and acceptance of the need for ecosystem-based management approaches including in the Aichi Convention on Biological Diversity Targets (2011-2020) and in key jurisdictions such as under the European Common Fisheries Policy and US Magnusson Stevenson Act¹. Over the last 20 years, a number of non-government and private sector initiatives have incorporated aspects of EBM with initial success, including the Marine Stewardship Council (MSC) and multi-stakeholder fisheries improvement projects. While this work has driven changes in fisheries management in some countries and has helped develop good practice in many fisheries it still needs to

¹ This includes the various definitions of ecosystem-based approach including and not limited to ecosystem approach, ecosystem-based management of fisheries, ecosystem-based fisheries management.

be underpinned and complimented by sound, ecosystem-based government policy, regulation, and management.

Furthermore, while the marine environment has multiple users and influences, the cost for those uses and impacts are largely opaque and not equitably shared – a situation that makes it difficult to hold user groups accountable. In fisheries, the burden of costs to improve to date, have largely fallen on fisheries themselves and are not shared by the supply chain or consumer. There are an increasing number of examples of consumers willing to pay a premium for MSC certified seafood, and of fisheries reaping greater rewards, but these remain few.

A Time for Change

A recent review found that there is willingness, especially amongst the seafood supply chain, to support ecosystem-based management in marine fisheries. This willingness is being turned into action with the seafood supply chain increasingly wanting to invest in fisheries improvement projects, often through supporting fisheries towards and into MSC (Short 2012). However the sheer number of fisheries needing improvement means that this must be significantly scaled up. Industry empowerment also needs to be scaled up such that the seafood sector front foots improvement and is no longer driven there by NGO scrutiny and public campaigning (Short 2012).

The question is who pays and how? Can that investment occur through payment for ecosystem services (PES) frameworks? Researching this academically and in practice over the last four years, the author has explored whether private sector supply chain investment could be deemed payment for ecosystem services in a marine context, what the methods could be to apply this in practice, whether this can contribute to rebuilding fisheries, and the challenges and opportunities of doing so.

A Model for Success

Ecosystem services link ecosystem processes and human well-being in terms of the direct and indirect benefits people obtain from ecosystems. Efforts such as the 2010 International Year of Biodiversity and The Economics of Ecosystems and Biodiversity (TEEB 2010) have helped to socialise ecosystem services. While some detractors have criticised this as “utilitarian”, there is a growing body of evidence that suggests ecosystem services support both conservation efforts and sustainable use. (MA, 2005, Naidoo *et al.*, 2011)

For terrestrial ecosystems, PES has also been employed to promote conservation and improve livelihoods (Wunder 2005, Engel *et al.*, 2008, Naidoo *et al.*, 2011, Ecosystem Marketplace 2010, RedLAC 2010). In fact, terrestrial payment for ecosystem services models have evolved to the point of being highly context specific, returning benefits to local communities, improving environmental and ecological outcomes, and enabling public-private partnerships (Naidoo 2011, RedLAC 2010, Houdet *et al.*, 2011).

Payment for Ecosystem Services in the Marine Environment

According to Wunder (2005) who set the conditions for payment for ecosystem services, they include voluntary transactions where a well-defined environmental service or a use that is likely to secure that service is being 'bought' by an environmental services buyer from an environmental services provider. This transaction is conditional and occurs if, and only if, the provider has secured the promised ecosystem service. This definition is useful to apply to fisheries given it focuses on using positive incentives and conditionality to influence behaviour. In terms of mechanisms to achieve payment for ecosystem services, both certification and ecolabelling have been identified as valid mechanisms (Forest Trends 2010, CBD 2011a, Koellner 2012) as there is a preferential market for more sustainable products. However, analysis of fisheries incentives has shown that this needs further development in practice and that the PES conditions could usefully strengthen fisheries improvement (Short, 2012, Bladon *et al.*, 2014).

Using ecosystem services in the marine environment is relatively new and has been slower to gain traction, although is being tested in specific sites such as the Meso-American Reef and the Birds Head in Indonesia. In addition, the proposed TEEB Oceans and Coasts being developed by the United Nations Environment Programme (UNEP) will seek to conduct an assessment of how ecosystem services can be more effectively applied in the marine environment.

Interest is growing in harnessing marine and coastal ecosystem services (MCES), such as carbon sequestration, fish nurseries, water purification, and marine biodiversity through markets, as well as developing payment approaches for this uncaptured value to finance their conservation and sustainable management (MA 2005, Ecosystem Marketplace 2010, Forest Trends 2010, Cannon 2010, Lau 2012). However reinforcing the need for accountability elements is this caution by Ruckelshaus and Chan (2010): "...there are no good measures or accountability systems for most marine ecosystem services, so ecosystem service characterization, quantification, and modelling will be central to these efforts."

Tallis *et al.* (2012) have developed a MCES measurement framework which could be used to design accountable marine PES and which includes the condition of the ecosystem (supply metrics), the amount of ocean resources actually used or enjoyed by people (service metrics), and people's preference for that level of service (value metrics). In addition, Micheli *et al.* (2013) have developed 30 indicators for seafood system sustainability assessments (see infographic 6) and which could usefully underpin seafood business corporate environmental reporting, especially if the Global Reporting Initiative G4 framework is used. The authors' research has understood how these elements could fit together to strengthen a seafood company's understanding of its impact and dependencies on natural capital, biodiversity and ecosystem services (i.e. what are the material issues), use a consistent set of seafood sector specific metrics to track management to address those impacts and dependencies, and transparently report. Although gradually increasing, currently only a handful of large seafood

businesses² (not retail or restaurants) are reporting and using the GRI G4 framework and none have consistent metrics, nor current guidance on how to apply the materiality analysis required under the G4 to seafood.

A Progression in Fisheries Management

While internationally, fisheries policy and management improvements, such as the 1995 United Nations Food and Agricultural Organisation (FAO) Code of Conduct for Responsible Fisheries and Ecosystem Approach to Fisheries (2003), have been increasingly well received, there is much debate on the status of fishery and ecosystem health overall (Worm *et al.* 2006, Worm *et al.* 2009, Pitcher 2001, Hilborn, Grafton *et al.*, 2013.).

To counter the decline of marine fisheries, many experts have called for ecosystem-based management (Ward *et al.* 2002, Pauly *et al.* 2002, Halpern *et al.* 2008, Tallis *et al.* 2010, UNEP 2011a, UNEP 2011b). Agreement also exists about the significantly increased wealth potential of rebuilt marine fisheries, the significant cost of recovering them, and the need for public-private partnerships and collaboration to do so (Short 2012, Bladon *et al.*, 2014, ISU 2012, World Bank 2012, Ye *et al.*, 2012, OECD 2012, Sumaila *et al.*, 2012, Rangeley and Davies 2012). It's a worthwhile investment with research showing that restoration can increase productivity fourfold and decrease variability by 21 per cent on average (Worm *et al.* 2006). From an economic perspective, estimates are that a fishery rebuilding investment of about USD\$203 billion would result in benefits surpassing costs after 12 years (Sumaila *et al.* 2012).

Interdisciplinary tools, including certification, marine spatial planning, bycatch reduction, and fisheries and habitat restoration projects are already being used by the seafood sector and could be expanded to embed fishery and ecosystem sustainability throughout supply chains. To be effective, however, these tools will need to be deployed alongside shifts in government management systems to being more ecosystem-based. There's also the big question of who pays for which elements? Because the seafood sector is dependent on the marine environment, the question can be asked whether payment for environment services models could be adopted to guide investment, improve fisheries and strengthen corporate accountability (Short, 2012, Bladon *et al.*, 2014)?

Other financial tools are being explored to enable multi-partner funding and understand, and meet the costs of recovering marine ecosystems, and rebuilding fish populations (Ecosystem Marketplace 2010, World Bank 2012, Ye *et al.*, 2012, OECD 2012, Sumaila *et al.*, 2012, Rangeley and Davies, 2012, UNEP 2011b). These range from adapting the UN Principles for Responsible Investment to fisheries (UNEP 2009), developing Fish 2.0 (Manta 2012) to create deal flow between investors and fisheries seeking investment, the emerging World Bank Global Partnership for the Oceans and the new Sustainable Seafood Finance initiative of Rabobank and WWF Netherlands.

² Highliner, Pacific Andes, Sanford, Bumblebee, Chicken of the Sea, Grieg Seafood, Leroy Seafood, Thai Union Frozen Products, Tassal (not exhaustive).

Ecosystem Services in Action in Seafood

In 2014, the largest Māori-owned seafood company, Aotearoa Fisheries Limited (AFL), with support from Terra Moana Limited³, conducted a Qualitative Ecosystem Service Review of New Zealand pāua. The Pāua Industry Council, the National Institute of Water and Atmospheric Research and Otago University School of Marine Sciences were core technical partners. The review was one of five led by Landcare Research under the auspices of the New Zealand Sustainable Business Council Business and Biodiversity project and in partnership with the Department of Conservation.

Pāua, the Māori name for abalone, is one of the most valuable AFL products. Traditionally, AFL canned the prime pāua meat, sold the trimmings to the nutraceutical sector, and shell to the ornamental / jewellery trade. This is changing, however, with increasing interest in live export from key Asian markets and the market being undermined by cheaper farmed product. With this as well as increasing pressures on all inshore New Zealand fisheries, AFL embarked on a sustainability journey⁴ to ensure their fishing and business practices are sustainable and aligned with the community values. This is their expression of Kaitiakitanga which means guardianship in Māori.

The ESR offered AFL an opportunity to holistically evaluate both its dependence and impact on the natural capital, biodiversity and ecosystem services relevant to pāua and to identify any business risks and opportunities. AFL's pāua ESR is a first for the New Zealand seafood industry, potentially internationally and represents a step change in fisheries management and industry empowerment. As Allyn Glaysher, the AFL Sustainability Director said: *"We had never done anything of this nature in AFL. To be perfectly honest, it was a 'leap of faith', an opportunity presented to us. We have been surprised at the amount of information we've got out of it and what it might mean going forward."*

Based on the review, AFL has identified a series of priority short-term actions that fall under four main categories: information needs (where there are knowledge gaps, for example the effects of rising sea temperatures and changing acidity associated with climate change), organisational changes within AFL, public policy engagement, and the need for collaborative ecosystem restoration.

Adapting Ecosystem Services

Into the future, payment for ecosystem services schemes linking ecosystem service buyers and providers across the terrestrial-marine interface, i.e. the coastal zone, could support ecological restoration, such as for kelp and which the ESR identified as a key need in the Marlborough Sounds to recover pāua. Restoring kelp habitat would also enable recovery of blue cod, popular with recreational fishers who could also contribute to the PES scheme. Lessons learned through these types of projects could be vital for individual ecosystems and add to government, community, sectoral and societal understanding of how

³ The authors' business partnership with Tony Craig.

⁴ http://www.afl.maori.nz/documents/AFLSustainabilityStrategy281114_000.pdf and add AFL ESR Compendium url.

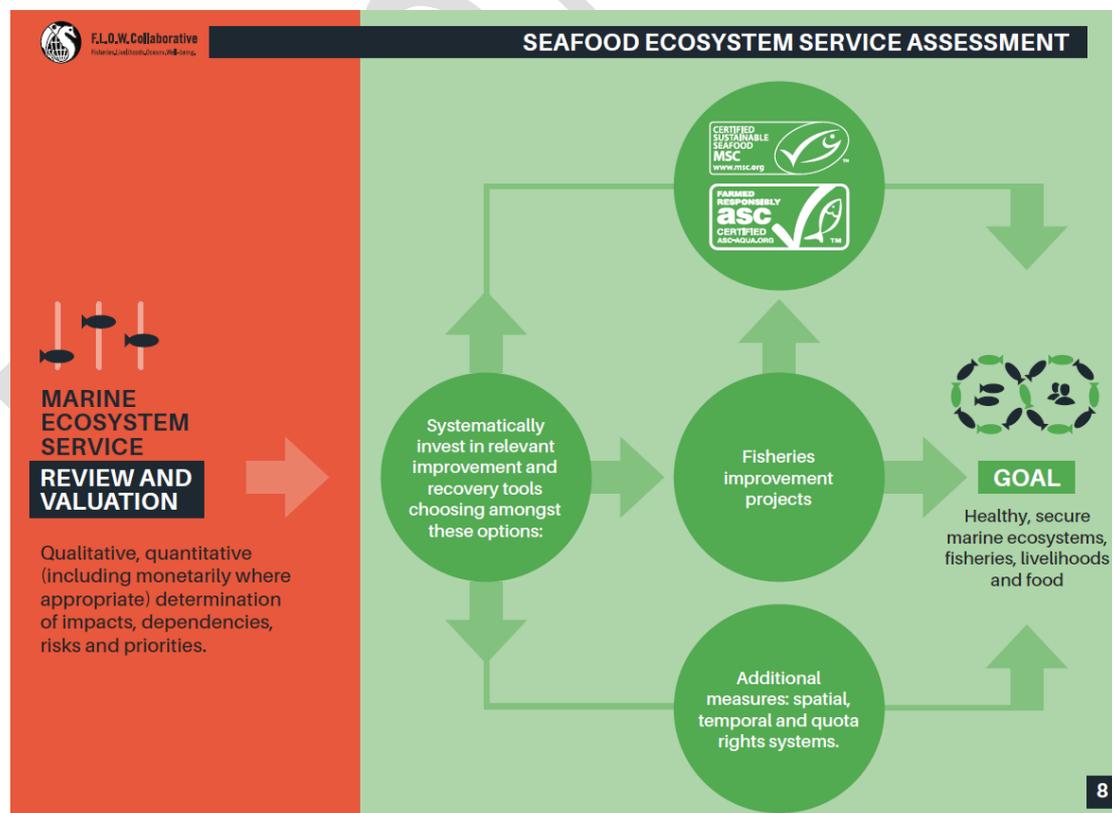
to successfully collaborative to implement payment for ecosystem service projects and practically restore ecosystems and productive fisheries.

Using ecosystem services offers a way to express multiple values about the natural world and so better share the responsibilities and costs for restoring the planet – our home.

Ecosystem Services in Seafood – A Visual Journey

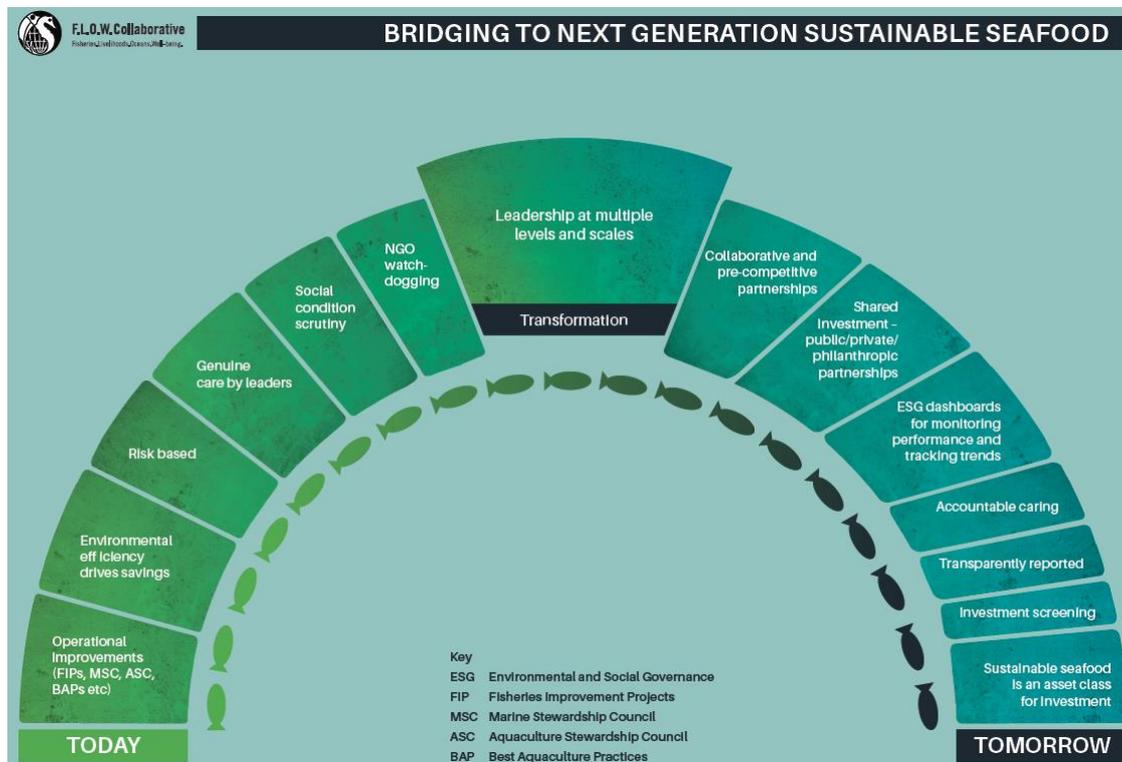
This research indicates that ecosystem services approaches including ecosystem service review and payment for ecosystem services could be powerful additional tools, if more deeply tested and applied in seafood sustainability, to build ecological, social, economic and corporate resilience. This is being further theoretically and practically developed by the PhD research of Annabelle Bladon through Imperial College Conservation Science and who is exploring the use of PES and conservation trust funds in the management of the Bangladesh Hilsa fishery.

Because this research and practice innovatively brings experience linking a range of arena including marine conservation, sustainable seafood, sustainable business and academic research, the author developed a series of illustrative infographics. These explain how ecosystem services could; support improvements in marine fisheries, particularly across the seafood system, empower seafood business, share the costs and understand multiple values of fisheries and seafood.



[n.b. the #8 needs to be removed] **Infographic 2 – Seafood ecosystem service assessment**
 Applying ecosystem services in seafood requires starting with as clear an understanding as possible of the qualitative and quantitative values of an ecosystem. In many cases this will require a full marine ecosystem service review and, where data is strong enough, valuation (using the most

appropriate valuation approach). Once this has occurred, goals can be set and ways to achieve those goals identified. These can include fisheries improvement projects (FIPs), certification such as through the Aquaculture and Marine Stewardship Councils, or other measures such as marine spatial planning and habitat restoration.



Infographic 3 – Bridging next generation sustainable seafood

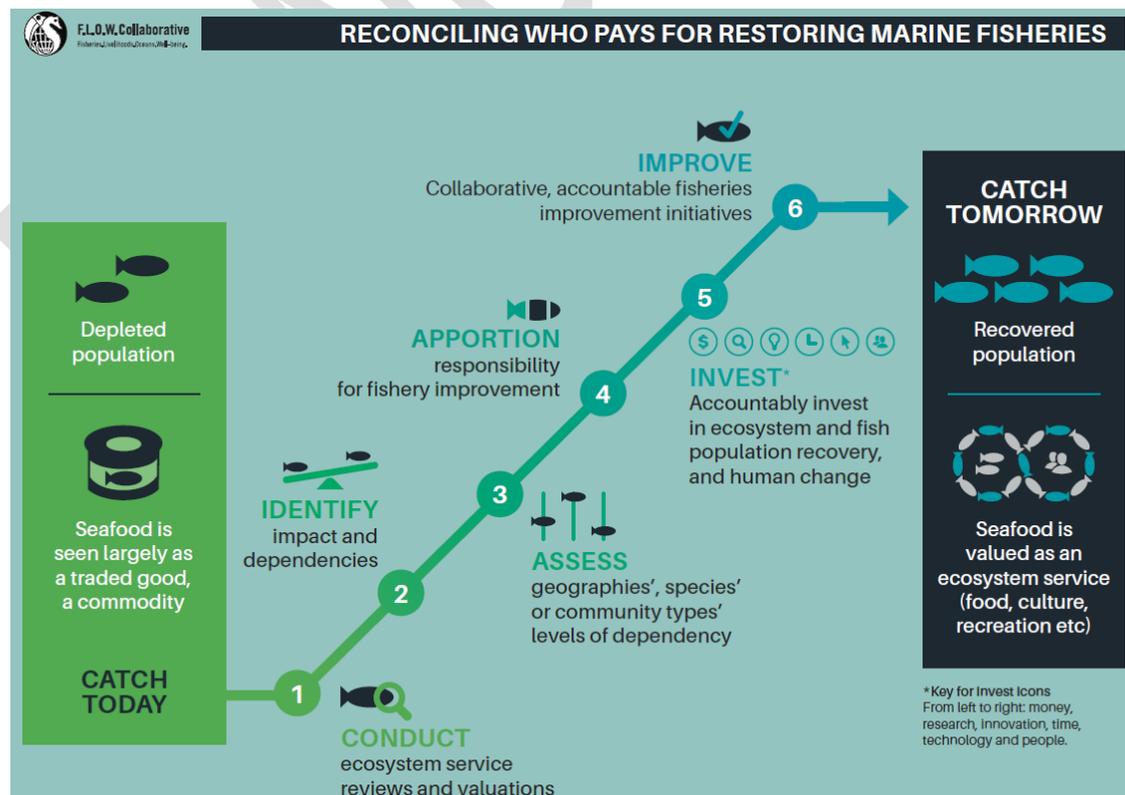
Creating sustainable seafood is a journey for all involved. It includes moving from largely bringing under control a company or fishery’s environmental and social impacts to a more proactive, collaborative, accountable and transparent approach that is inclusive of all environmental services providers and buyers, and that reaps rewards in terms of staff morale, shareholder scrutiny, economic and environmental efficiency and social licence to operate.

....continues....



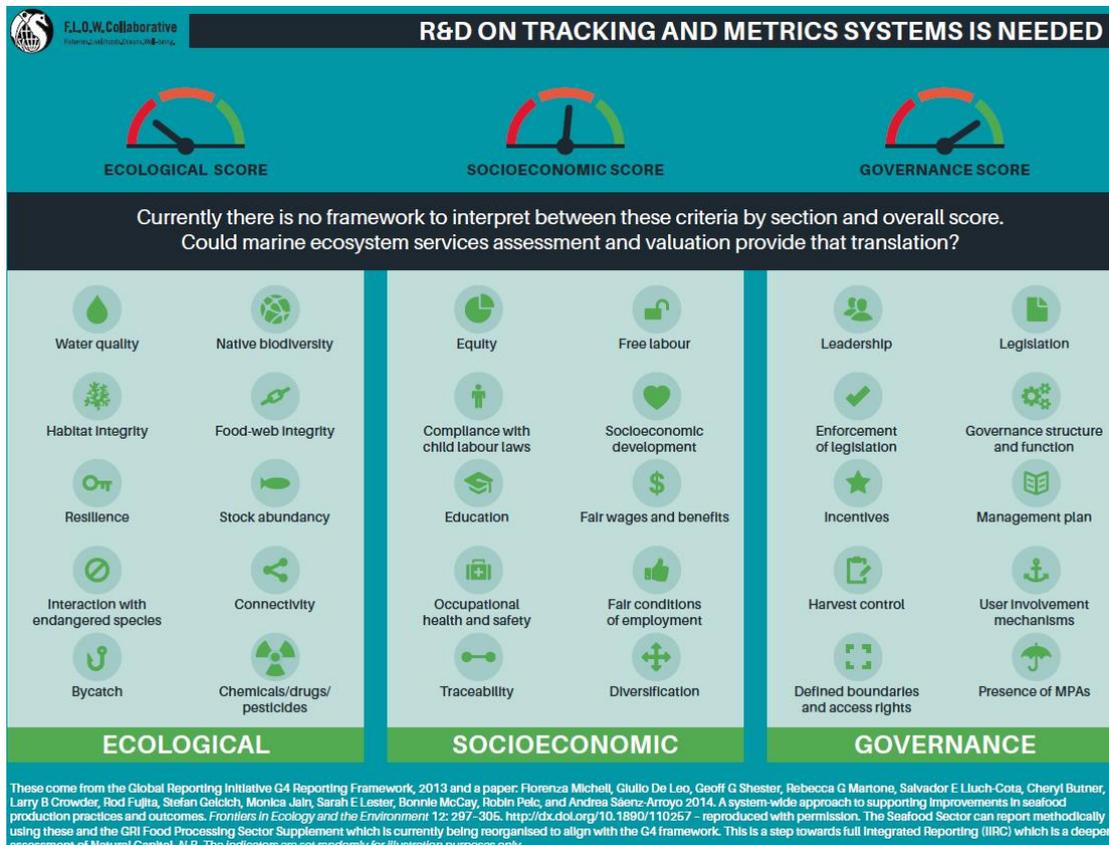
Infographic 4 – Foundation principles for seafood systems change

When it came to setting up in business, the author endeavoured to document her beliefs, sustainability ideals and business principles, and started with an internal check based on her professional and academic experience. The results identified commonalities with the underlying principles for system transformation. Each principle – from courage to transparency to trust – are interconnected and crucial to success.



Infographic 5 – Reconciling who pays for restoring marine fisheries

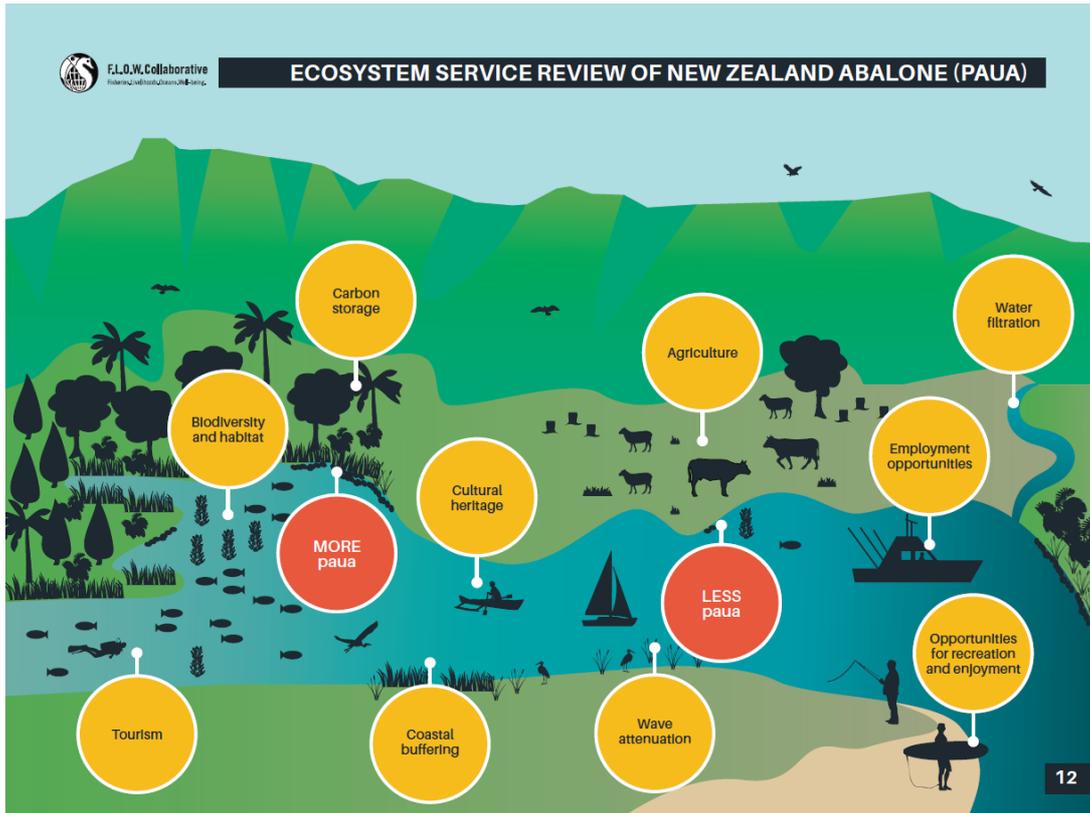
These six steps take a seafood company, fishery or product supply chain (group of companies linked by mutual interest in a species or place) through understanding their relative impacts and dependencies on natural capital, biodiversity and ecosystem services. It also enables logical analysis of which company in the supply chain could or should pay how much to contribute to any fishery and/or habitat restoration.



Infographic 6 – R&D on tracking and metrics system is needed

Thirty indicators were identified in a system-wide assessment developed by Micheli et al, 2013 and turned into infographics by the author given they could underpin and significantly strengthen corporate reporting in seafood companies, if applied through the Global Reporting Initiative G4 Framework. As ecosystem services are better refined and applied it should become possible to better calculate and weight each criteria to develop an overall score across ecological, socioeconomic and governance indicators – of increasing interest to future employees, stock exchanges, investors and insurers.

....continues....



Infographic 7 – Ecosystem Service Review of New Zealand abalone (pāua)

The AFL ESR found that amongst other threats to pāua, that sedimentation in the Marlborough Sounds was a severe impact and that where coastal native forest remained intact in other locations that there was a more productive pāua fishery.

About the Author

After working for non-governmental organisations (NGO), including as WWF International Fisheries Officer, Katherine Short recognised that while great strides had been made in improving fisheries over the past 20 years many continued to be in crisis with management approaches often fragmented, ineffective and held back by mainstream management paradigms.

In the early 2000s, Katherine along with many other fisheries experts globally began to consider ways ecosystem-based management could be applied in fisheries. Katherine led the development of the first NGO framework for this and a decade later, in 2010, took it further with a Masters Degree at Imperial College London researching whether and how payment for ecosystem services frameworks could be applied to fisheries.

Katherine left WWF in 2013 to start F.L.O.W. Collaborative Ltd (Fisheries.Livelihoods.Oceans.Well-being) and establish a business partnership, Terra Moana Ltd with Tony Craig, a 30+ year New Zealand seafood industry businessman. This combined their backgrounds and brings the strengths of natural capital and ecosystem services to primary industry, including as sustainability advisers to the largest Māori seafood company, Aotearoa Fisheries Ltd.

Thank you to Dr David Agnew for sponsoring the Masters Degree, Dr E.J. Milner-Gulland and Dawn Martin for invaluable supervision and support. Dr Lida Pet-Soede was a gem recommending that part of the Masters explore applying ecosystem services to seafood. Tony Craig’s faith and courage in jumping into this together is inspiring as is Aotearoa Fisheries Limited for testing ESR with pāua. A discussion with Dr Marjan van den Belt provided crucial encouragement and documenting this learning would not have been possible without support from The David and Lucile Packard Foundation, Annette Ellis for the infographic design and Shelly Biswell (Catchphrase Communications) in helping to shape this article. As always, Margaret Moore’s mentorship throughout is precious.