The Future of Sustainability in Pacific Pelagic Fisheries

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Why The Future of Fish?

Understanding That the Ocean's Future is Our Future

We know from school that most of the Earth is water. We also know that we are using this resource and the life that lives in it at an unsustainable rate. The Northwest Atlantic fisheries collapse in the 1990s was a wakeup call to a future where we no longer have enough seafood to sustain the world.

Using the **University of Houston Foresight Methodology**, this study looks at four scenarios related to the futures of fishing in the Pacific Ocean. We first define the **Domain**, take a glimpse into **Current Events** and **Trends**, gain insights from an expert in the field **Interview**, then start to probe what are the primary **Drivers** in this domain.

Next we explore four **Scenarios**, from Baseline and New Equilibrium, to Collapse and Transformation. Then we take a closer look at how a Transformation future might veer course from a Baseline future.

Last, we take a look at the **Implications** and some possible innovative **Actions** that an NGO might take. At the end of this journey, there is some additional food for thought.

So join me on this journey through the Futures of Fishing.

- JT Mudge

The Domain

Exploring the impact of regulations, cultures, market forces, and technology on the environmental and economic health of Pacific pelagic fisheries.

In The News

US–China rivalry ramps up pressure on the Pacific

As the US–China geostrategic competition intensifies, Pacific island countries find themselves caught in the middle.

Identifying the species of harvested tuna and billfish using deep convolutional neural networks

The images of fish catch are acquired on the decks of fishing vessels. Deep convolutional neural network classifiers are used to identify the species from the images. The proposed approach achieves an accuracy of at least 95%.

Napier fishing couple live streaming their boats for world to see

Asif and Sarah Nasir have done what the Government hasn't by demonstrating their day-to-day commercial fishing boat asking in transparency of the commercial fishing industry.

From scorpion skewers to cricket flour, bug protein is becoming big business

Mike Tatarski visited Cricket One, one of the world's largest cricket farms, to see how they are being caught and cultivated.

This New Metric Wants To Hold Companies Accountable for the State of the World

The ESG metric – which are designed to be included in a company's regular financial reports – will tell investors, consumers, and employees how well a company is doing on issues such as climate change, biodiversity, workplace diversity and governance.

TRENDS

Meet the Expert

An interview with a director at The Nature Conservancy

Top Issues

Drivers

Connected Seas

New satellite and cellular technology brings high-speed internet to remote places, allowing data to be transmitted at sea or shore.

Certified Sustainability

Accountant track seafood from catch to consumer and create certifications.

Inexpensive Sustainable Alternatives

Consumers turning to alternatives that have higher food energy yields and can be sustainably harvest.

Conscious Buying

Consumers are looking for ways to live sustainably and purchase products that are eco and human rights friendly.

Science at Sea

New technologies are allowing data scientists and average citizens to get access to a wealth of data.

Corporate Caring

Corporations are playing an increasing role in sustainability.

Kaizen

Land In Sight

We are some sustainability successes, but overall sustainability continues to improve, but there is far from out of danger. There are significant global economic effects.

Collapse

Sharknado

Shark species are being caught and mistrust of governments leave no way to improve sustainability.

Fisheries around the world collapse – worst health decline.

Transformation

Smooth Sailing

Government and consumers targets sustainability with concrete real-time supply chain monitoring – Sustainability is the new crown.

Seanarios

Tech divide creates pockets of sustainability – some fisheries fail.

Seafood becomes a luxury while meals become primary source of food for lower income.

Stakeholder Capitalism becomes the norm.

Lost at Sea

Land In Sight

2017 – Albertson's launches Certified Sustainable Products line – customer response is disappointing

2017 – The Federal United States of Microeconomics has local success and fare fishery improves. Shared prosperity and sustainability spreads to other countries from modeling success.

2018 – Several small Pacific Island economies collapse after decades of climate change storms and declining local fisheries.

2020 – Cricket flour goes from big cube to US. Novelty spreads but only in select areas.

Smooth Sailing

2017 – Albertson's, Amazon, and others partner with Marine Stewardship Council.

2017 – The Nature Conservancy creates a global data and interpretation ability mandate for all technical fisheries.

2018 – Corporations take on more risk responsibilities as governments fail to accomplish much – fear of corporate rights.

2020 – Amazon sets aside 10 b to help aid sustainability programs.

Eastern Australian Pacific Salmon fishery collapses - wake up call to world

2006 – 60% of all Fortune 500 companies have Chief Sustainability Officers.

2006 – Social shaming for unsustainability leads to decline in packaging and "sling shot" non-low profits.

2007 – World Conservation Forum WCF Founded in Helsinki – corps come together to create policy.

2007 – WCF members now largest economy in the world – WCF creates global "sustainable policies".

2008 – Global Food Network (GFN) becomes the largest grocer in the world. "Sustainability" is now a mandate.

2009 – Fisheries are back to 1970 levels.

2009 – Automated fishing and science reveal Bycatch, Pollution, and Low fish that leads to carne for Smart Lanzar.

2010 – 50% of all food is now sustainably – water scarcity drives governments (2018).

2012 – Albatross is sustainably and is hard to find species – Fundraising WCF and GFN – not governments.

2013 – WCF recognized as nation with headquarters on the moon.

Implications

DIVE

Wanting to know more about what is in this deck? Browse through the Table of Contents, Stakeholders, Key Questions, Key Terms and Glossary.

Current State

Impacts and Beyond

A recent UN report predicts our population will reach 9.7 billion by 2050. Our current consumption patterns are not sustainable and will need to be adjusted to ensure we have enough food, water and other protein intake from fish, and some small island states depend almost exclusively on fish.

The world produces more than 155 million tons of seafood each year.

33% of global fish stocks are overexploited. The most low-value species are most at risk of being overexploited. Overfishing is a global problem, but it is most prevalent in developing countries, where 90% of the world's small-scale fishers live. Overfishing is not the only threat to our oceans. Climate change is also a major factor, and current global number around 1.5 C is the critical tipping point for ocean ecosystems.

Main pelagic species in the **Western Central Pacific** include swordfish, sawfish, tuna, billfish, sharks, and other species of concern. Other species of concern include, but are not limited to, species, marine mammals, sharks and rays, crabs, prawns, shrimps, corals, coral reef species.

The waters of the **Western and Central Pacific Ocean** produce almost half of the world's tuna.

Illegal and Unreasonable Practices

Illegal, Unreported, and Unregulated fishing is used to make fishing easier, boosting profits at the expense of populations, other species. A 2015 estimate cites that 15,000 FADs may be deployed annually.

Bycatch is the unintended catching of species other than the intended species. Bycatch is a problem because it can lead to overfishing of species that are not intended to be caught and recovering depending populations.

Sustainable Strategies

Regulations and governance strategies such as the **MSA** are having an impact on the ocean, but they are not fully sustainable fishing practices.

Organizations like **Marine Stewardship Council** verify sustainably sourced seafood and have created a standard for sustainable fishing practices.

Industry partnerships like **Sustainable Fisheries Partnership** have brought together stakeholders from across the seafood supply chain to promote responsible practices and policies.

Stakeholders

Regional Governments: Federated States of Micronesia
None of the citizens depend on seafood for food security in the FSM but had income. * FSM President, Peter Christian, urged governments to take action to protect the ocean from the impacts of climate change.

NGOs and non-profits: WWF works with Oceanic to create the Marine Stewardship Council.* The Ocean Foundation is creating a sustainable and tuna supply chain company - Pacific Islands Tuna Company.

Retailers: Whole Foods has expressed interest in selling and promoting sustainably caught tuna.
Retailers are under pressure to ensure fishing gear and methods are being used to capture the fish they are selling. Retailers are also under pressure to ensure their supply chain is ethical.

Consumers: In a survey of 16,000 seafood consumers, sustainably caught/fished was the most valued with 72% of respondents. Millennials were the most pro-ocean sustainability conscious.

Fishers: Fishers are the first link in the supply chain to the distribution of responsibly sourced seafood companies.*

Reference: Jon Fuller's report: Marine Stewardship Monitoring, 2014 for the accuracy & logic and the quality of data to prove that regulations and guidelines are being met to be updated.

Recent History

1965-present - Technological advances allow fishermen to harvest seafood at unprecedented levels including large trawling nets and FAD aggregating devices (FADs).

1992 - Collapse of Canada's Atlantic cod fisheries becomes symbolic of the overfishing problem. Canada's Atlantic cod fishery had been the most productive groundfish fishery in the world for around the world. It is still cited widely today as the beginning of today's conservation efforts.

1995 - The United Nations adopts the Code of Conduct for Responsible Fisheries.

1995-2000 - In light of the devastating Atlantic cod collapse, the **Marine Stewardship Council** is formed in 1997 and the **Forum for the Future** launches the Marine Stewardship Council, a leading sustainability standard and certification program for fisheries. In 2000 the first fisheries are certified.

1999 - First trial of Electronic Monitoring for fisheries.

2000 - Western & Central Pacific Tuna Commission is established to manage the tuna fisheries in the region through effective management, the long-term conservation and sustainable use of highly migratory fish stocks*

2005 - UN's Food and Agriculture Organization (FAO) adopts guidelines for the responsible marketing of fishery products.

2007 - At Netherlands' retailers pledge to only purchase and sell 100% sustainably caught seafood.

2015 - the Global Sustainable Seafood Initiative (GSSI) launches to help verify benchmarks for seafood.

2015 - UN launches a series of Sustainable Development Goals (SDGs) at the UN Sustainable Development Summit. The SDGs are a collection of 17 interconnected global goals. Goal 14 focuses on the ocean, seas and marine resources.

2017 - Oceanic Development Project launches to help drive sustainable tuna fishery.

2017 present - Monitoring companies such as **Satlink** and **Thetis** launch to help ensure the integrity of products in electronic monitoring short cuts.

TIPPs

Trends, Issues, Plans, & Projections

Trends

Category	Description
Economic Development	Developed and Developing countries are both impacted by overfishing.
Environmental	The impact of illegal fishing is up to an estimated 40% larger than the reported catch in some developing countries, which is a serious threat to food security and livelihoods. Illegal, unreported and unregulated fishing is a major threat to the Western and Central Pacific Ocean.
Environmental Technology	Electronic Monitoring (EM) is being used to verify fishing practices. Since EM's application has been so critical to tracking and fish counter capture, companies are using EM to verify other practices such as bycatch, species, and catch location.
Institutional Governance	**FAD aggregation and fishing gear:** Fishers are using FADs to increase their catch and fishing gear to increase their efficiency.
Political Governance	Global ocean ecosystems continue with more area becoming endangered.
Technology Innovation	Electronic Monitoring (EM) is being used to verify fishing practices. Since EM's application has been so critical to tracking and fish counter capture, companies are using EM to verify other practices such as bycatch, species, and catch location.
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Alternative Protein Sources	Alternative protein sources are a growing trend.

Issues

Category	Description
Economic Development	Overfishing can be a problem in developing countries.
Environmental	**Overfishing:** global species such as salmon sharks will is at risk from bycatch and overfishing.
Environmental	**Bycatch:** Bycatch is a problem because it can lead to overfishing of species that are not intended to be caught, hurting those marine ecosystems dependent on those species.
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Political Governance	Agencies, councils, governments, and regulators across the globe are reducing their ability to protect the ocean and its species.
Technology Innovation	**What impact will technology have on the ability for agencies to verify and enforce sustainable fishing laws?**
Technology Innovation	Electronic Monitoring (EM) is being used to verify fishing practices.
Technology Innovation	**Are there any ways to adapt technology to verify sustainable practices? How can technology be used to verify sustainable practices?**
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Plans

Category	Description
Economic Development	Many Developing countries are dependent on fishing as a source for food security and income. Fishing is a major source of income in the Western and Central Pacific Ocean. Tuna is the most valuable commercial species of fishing source in the Pacific.
Environmental	Flag of Convenience (FoC) Vessels (Flag of Convenience) are used to hide illegal, unreported, and unregulated fishing. Flag of Convenience (FoC) vessels are used to evade regulations and conceal violations and illegal fishing practices.
Alternative Protein Sources	**What are the ecological impacts of alternative protein sources? Are alternative protein sources a sustainable fishing option?**

Projections

Category	Description
Institutional Governance	**Bycatch Reduction Devices, Turtle Excluder Devices, Fishers, Bycatch Hotspots, Bycatch Quotas, Bycatch Reduction Devices:** Bycatch is a major problem in the Western and Central Pacific Ocean. Bycatch is a major problem in the Western and Central Pacific Ocean. Bycatch is a major problem in the Western and Central Pacific Ocean.
Technology Innovation	**The future of bycatch: Are there 2030 Bycatch Controls, Cameras, Sensors, & Lasers?**
Technology Innovation	**What technologies are available to reduce bycatch? Are there 2030 Bycatch Controls, Cameras, Sensors, & Lasers?**
Technology Innovation	**The future of bycatch: Are there 2030 Bycatch Controls, Cameras, Sensors, & Lasers?**

Key Alternative Futures Drivers

Consumption	**Ocean Health**	**Technology**	**Governance**	**Economic Development**	**Alternative Protein Sources**
Consumption patterns are changing, including an increase in demand for seafood, including sustainably caught seafood. Millennials are the most pro-ocean sustainability conscious consumers.	Ocean Health is a major issue. Overfishing is a major issue. Bycatch is a major issue. Climate change is a major issue.	Technology is being used to verify sustainable fishing practices. Technology is being used to verify sustainable fishing practices.	Governance is being used to verify sustainable fishing practices. Governance is being used to verify sustainable fishing practices.	Economic Development is a major issue. Economic Development is a major issue.	Alternative protein sources are a growing trend. Alternative protein sources are a growing trend.
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Baseline vs. Transformative

Baseline and Transformative Scenarios for Sustainable Seafood Consumption, Ocean Health, Technology, Governance, Economic Development, and Alternative Protein Sources

Sustainable Sea 2050

Baseline Scenario

Sustainable Sea 2050 is a baseline scenario for the Western and Central Pacific Ocean. Sustainable Sea 2050 is a baseline scenario for the Western and Central Pacific Ocean. This scenario includes changes and improvements from the Sustainable Fisheries Partnership's Sustainable Seafood Roadmap, which is a baseline scenario for the Western and Central Pacific Ocean.

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Healthy Seas 2050

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Selected Sources