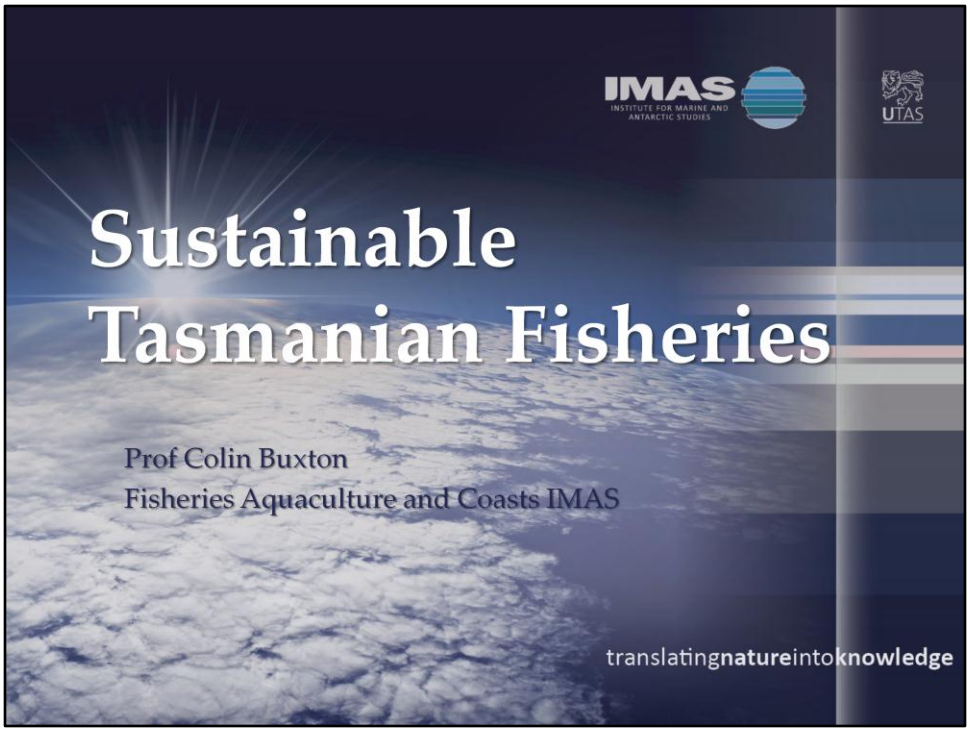


SUSTAINABLE TASMANIAN FISHERIES

Prof Colin Buxton
Director IMAS Fisheries, Aquaculture and Coasts
Address to the Royal Society Tasmania
July 2013

Abstract
Sustainably caught seafood is one of the most nutritious sources of food and environmentally friendly and with a growing population the world can hardly afford not to derive this benefit from the ocean. Yet fisheries face a number of significant challenges and much needs to be done if we are going to be able to contribute to future food supply and food security. How we meet these challenges will determine the future and opportunities for the sector in Tasmania.

Good evening Chancellor, members of the Society and ladies and gentlemen.

The theme of the Winter Series is "*Future proofing the food supply: food security and food innovation in Tasmania*"

I'm going to talk tonight about marine capture fisheries, looking at the challenges facing the sector and suggesting some of the opportunities that we might have in Tasmania under the winter series theme.

I hope these images wet your appetites and I hope that most of you, no all of you, are aware of and accept the health benefits of seafood and look forward to your next meal of fish, be that in a restaurant, from your local deli or your days catch cooked at home.

Other than being one of the most nutritious sources of food, seafood is part of our social, cultural and economic fabric – I can't imagine a menu that didn't have a serve of salmon, blueye, trumpeter, flathead, squid or oysters as options!

But seafood industry today suffering an image crisis

On one hand we have all of this good news about the health benefits of seafood…….

But on the other we have a constant barrage about overfishing and the rape of the oceans, fed by scaremongering and in some cases an anti-fishing agenda of many ENGOs and some sectors of the science community.

Take the supertrawler debate:

- Here was a carefully planned, precautionary fishing operation
- The proposed use of the catch was for human consumption as opposed to fishmeal
- But the public and political sway was against so called "industrial fishing" and strongly supported by a recreational sector concerned over the impact of the commercial operations on their recreational fishery for SBT – a listed threatened species!

But I digress….. we can return to this later.

Sustainable Seafood
In large measure it all comes down to sustainability.

Sustainability is the capacity to endure. For humans, sustainability is the potential for long-term maintenance of well being, which has ecological, economic, political and cultural dimensions.

We use the term *sustainability* in the sense of human sustainability on planet Earth - perhaps the most widely quoted definition being that of the Brundtland Commission:

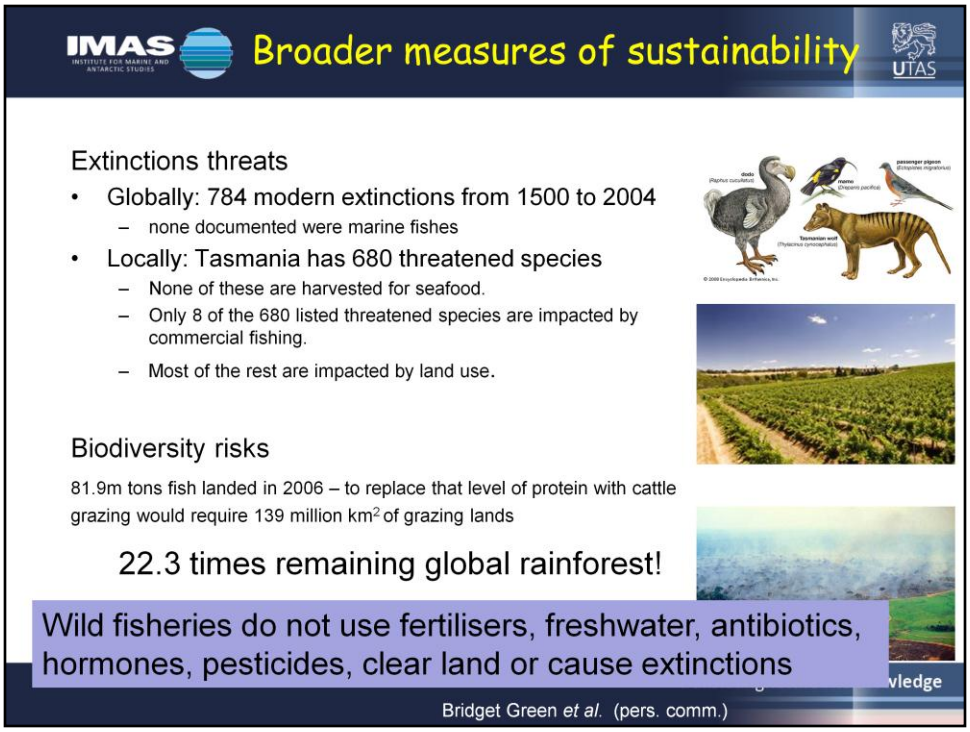
"sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Public concern over sustainability

And make no mistake the public is increasingly concerned about sustainability, and so they should be.

Sustainability is also the focus of our fishing industry, our fisheries management legislation and the key to the opportunities that exist in addressing seafood security and seafood futures.

(Images courtesy of the FRDC)



Broader measures of sustainability

And in this context we need to be mindful of the broader sustainability issues and what we might call the marine difference.

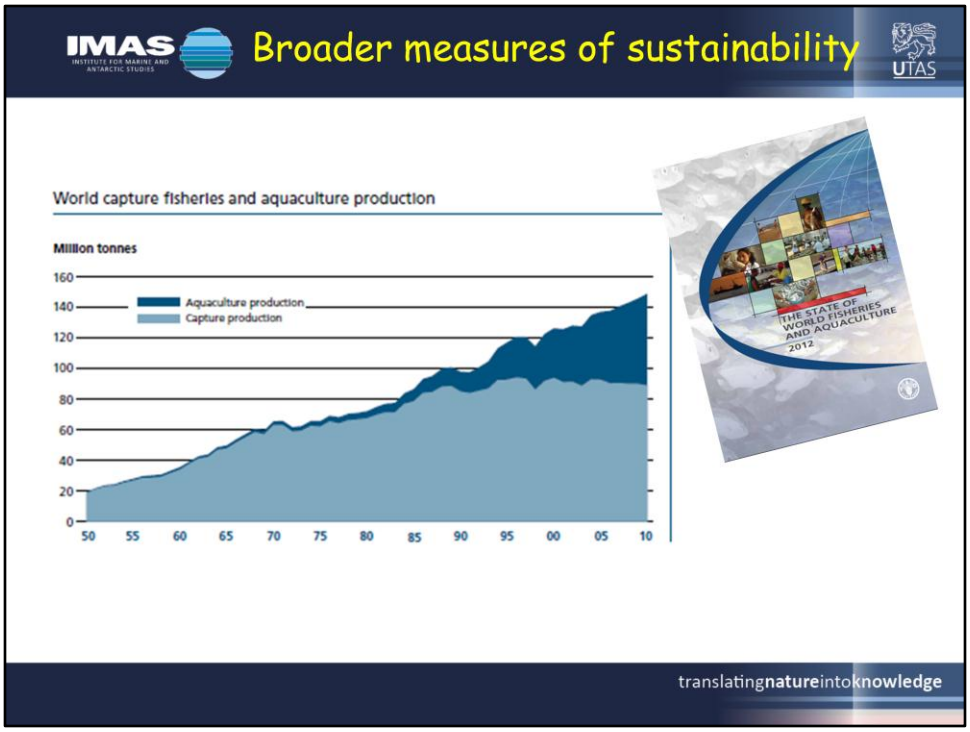
Globally we are aware of 784 extinctions in recent times – none were marine fishes.

In Tasmania we have 680 threatened species – none are harvested for seafood (noting of course that we do target SBT which is listed under the Commonwealth). Only 8 of these are impacted commercial fishing. Most are a consequence of land use.

Our colleague Ray Hilborn has calculated that if we were to replace fish protein sources with cattle it would require 139million square km of grazing lands.

We should also note that fisheries do not use fertilisers, freshwater, antibiotics, hormones, pesticides, clear land or cause extinctions.

(slide courtesy of Bridget Green)



Global seafood statistics

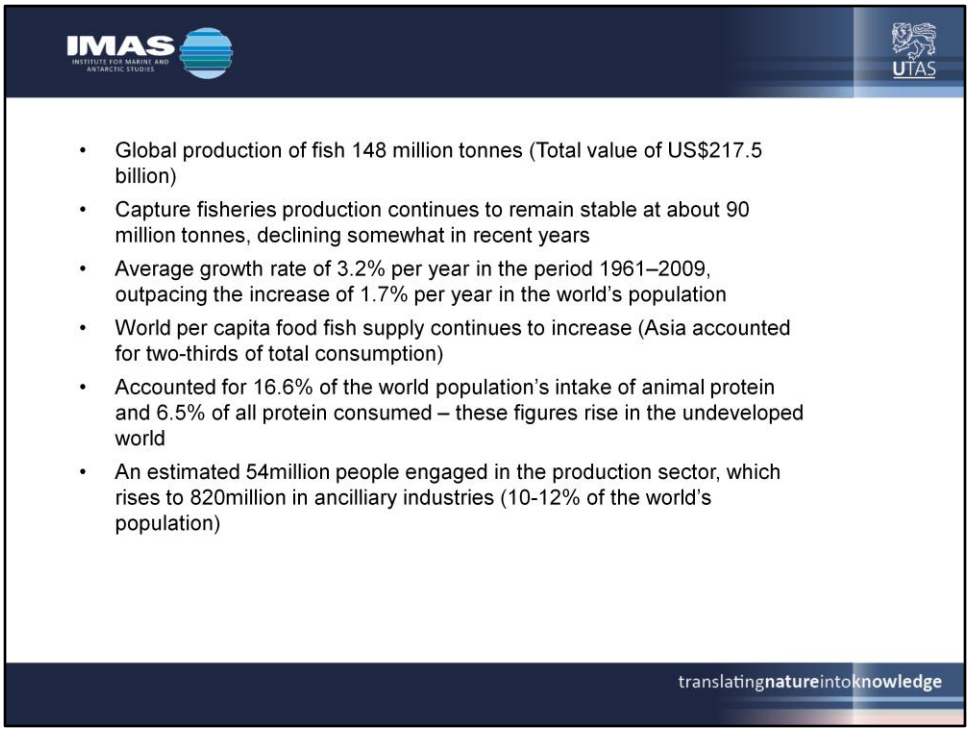
Let's first look at the global scene.

The latest available information shows that capture fisheries and aquaculture supplied the world with about 148 million tonnes of fish in 2010, of which about 128 million tonnes was utilized as food for people. (The total value of was estimated to be US$217.5 billion).

Preliminary data for 2011 indicate increased production to 154 million tonnes, of which 131 million tonnes was destined as food (FAO 2012)

Overall global capture fisheries production continues to remain stable at about 90 million tonnes

(The state of world fisheries and aquaculture. FAO Rome, 2012)



With sustained growth in fish production and improved distribution channels, world fish food supply has grown dramatically in the last five decades, with an average growth rate of 3.2% per year in the period 1961–2009, outpacing the increase of 1.7% per year in the world's population.

World per capita food fish supply increased from an average of 9.9 kg (live weight equivalent) in the 1960s to 18.4 kg in 2009, and preliminary estimates for 2010 point to a further increase in fish consumption to 18.6 kg.

Asia accounted for two-thirds of total consumption.

Fish and fishery products represent a very valuable source of protein and essential micronutrients for balanced nutrition and good health. In 2009, fish accounted for 16.6% of the world population's intake of animal protein and 6.5% of all protein consumed. Globally, fish provides about 3.0 billion people with almost 20% of their intake of animal protein, and 4.3 billion people with about 15% of such protein. In some island nations it is as high as 40%.

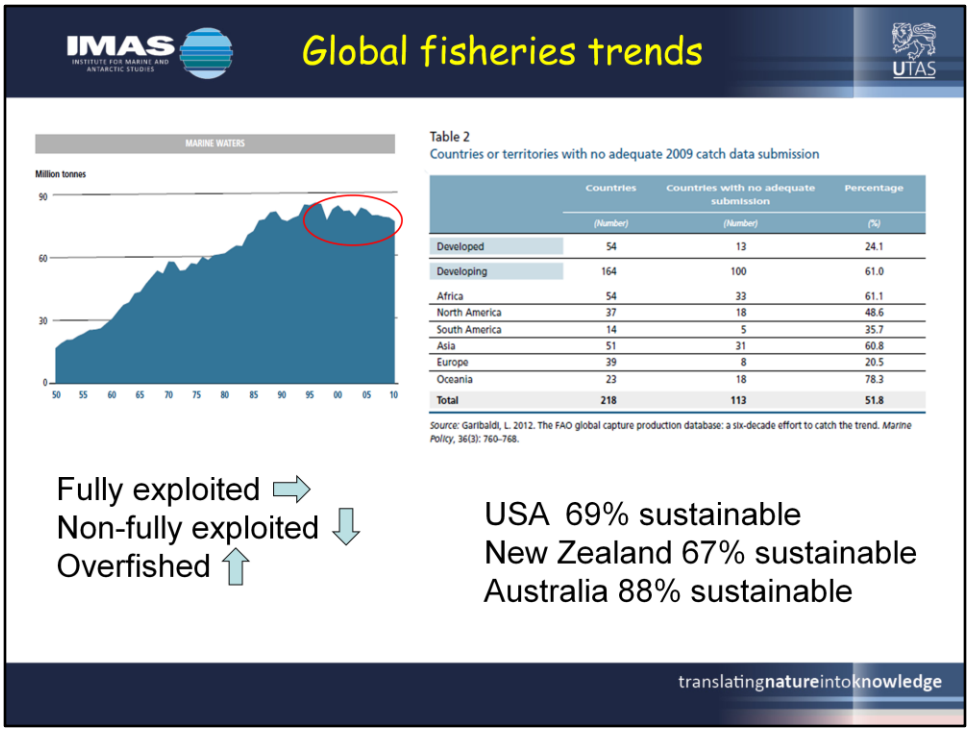
A sizeable share of fish consumed in developed countries consists of imports, and, owing to steady demand and declining domestic fishery production (down 10% in the period 2000–2010), their dependence on imports, in particular from developing countries, is projected to grow in coming years.

Fisheries and aquaculture provided livelihoods and income for an estimated 54.8 million people engaged in the primary sector of fish production in 2010, of which an estimated 7 million were occasional fishers and fish farmers.

Apart from the primary production sector, fisheries and aquaculture provide numerous jobs in ancillary activities such as processing, packaging, marketing and distribution, manufacturing of fish-processing equipment, net and gear making, ice production and supply, boat construction and maintenance, research and administration. All of this employment, together with dependants, is estimated to support the livelihoods of 660–820 million people, or about 10–12% of the world's population.

Fish and fishery products continue to be among the most traded food commodities worldwide, accounting for about 10% of total agricultural exports and 1% of world merchandise trade in value terms.

(The state of world fisheries and aquaculture. FAO Rome, 2012)



But the big question is “Are our fisheries sustainable?” and of course there is no simple answer.

Although the global picture has remained fairly stable, there are some worrying trends. The declining global marine catch over the last few years together with the increased percentage of overexploited fish stocks and the decreased proportion of non-fully exploited species around the world convey the strong message that the state of world marine fisheries is worsening and has had a negative impact on fishery production. Overexploitation not only causes negative ecological consequences, but it also reduces fish production, which further leads to negative social and economic consequences.

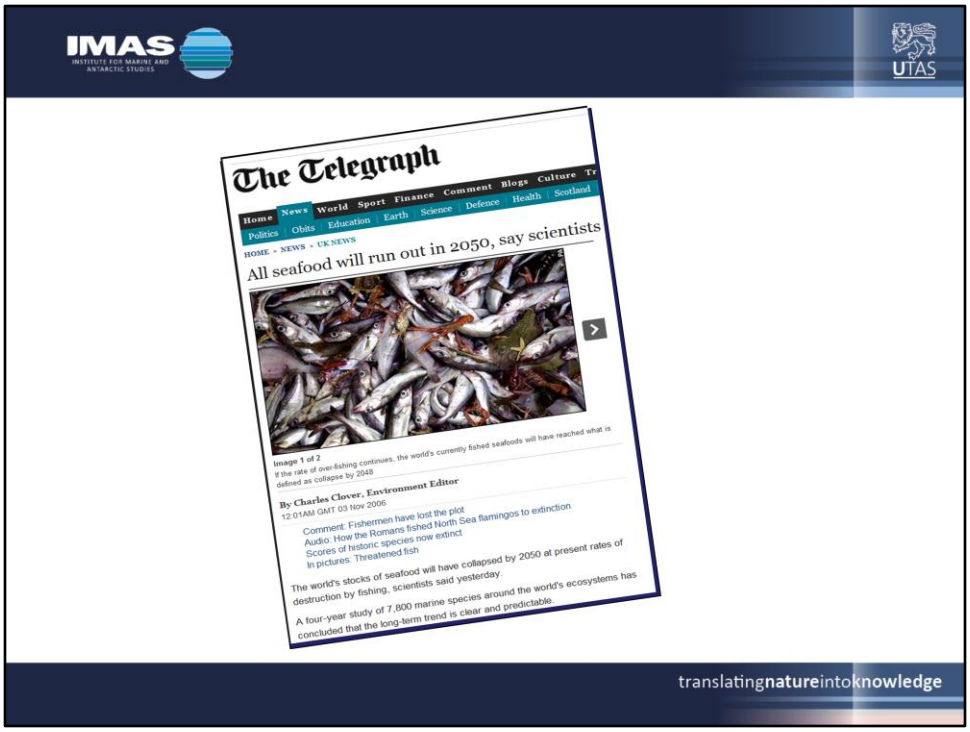
There is also a concern that we don’t assess the fisheries in many places in arriving at this view.

But, as reported by the FAO (2012), “In spite of the worrisome global situation of marine capture fisheries, good progress is being made in reducing exploitation rates and restoring overexploited fish stocks and marine ecosystems through effective management actions in some areas”.

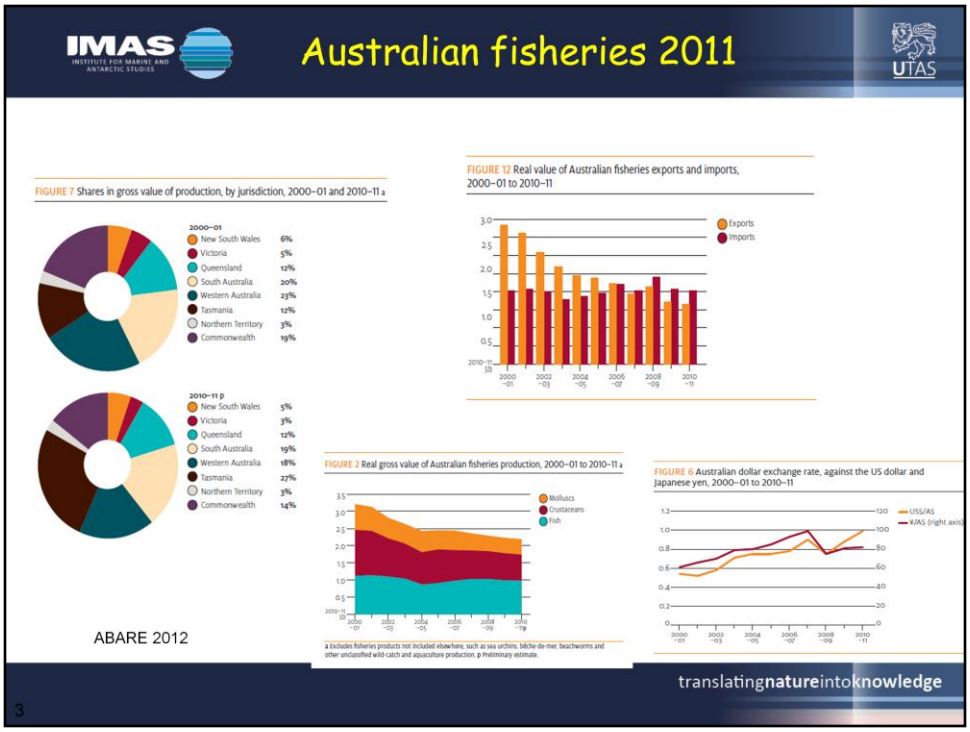
In the United States of America, for example, 67% of all stocks are now being sustainably harvested, while only 17% are still overexploited. In New Zealand, 69% of

stocks are above management targets, reflecting mandatory rebuilding plans for all fisheries that are still below target thresholds. Similarly, Australia reported overfishing in only 12% of stocks in 2009. There are many other examples.

(The state of world fisheries and aquaculture. FAO Rome, 2012)



These and other successes can serve as examples to assist in more effective management of other fisheries and stand in stark contrast to some of the doom and gloom predictions in the literature



Australian Fisheries Statistics

The total volume of Australian fisheries production in 2010/11 was 234 164 tonnes, valued at to $2.23 billion, around 60% of which came from the SE region including Tasmania, South Australia, Victoria, southern New South Wales and some Commonwealth fisheries (ABARE 2012).

The wildfishing sector accounts for around 60% of the overall production (162 762 tonnes valued at $1.31 billion). The major species in the SE region are SE trawl species, Australian sardines, rock lobster and abalone.

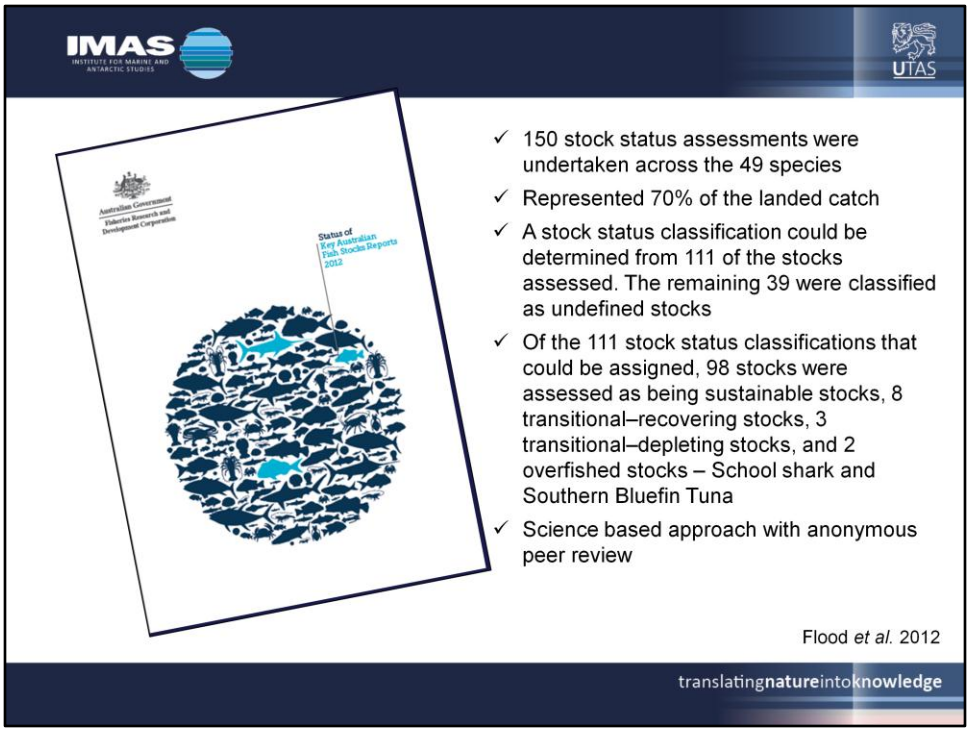
Historically, Australia has been a net importer of fisheries products in volume terms but a net exporter in value terms. This disparity reflects the composition of Australian fisheries exports compared to imports. Australian fisheries exports are dominated by high value species such as rock lobster, tuna and abalone, while imports largely consist of lower value products such as frozen fish fillets, canned fish and frozen prawns. In recent years, the gap between imports and exports has closed. In 2007-08 Australia became a net importer of fisheries products in value terms.

Australian fisheries products export earnings (edible and non-edible) has fallen by 57% over the past decade (from $2.9billion to $1.2 billion), mainly attributed to lower export unit prices following the appreciation of the Australian dollar against the US dollar and the Yen.

In 2007-08, Australia's major seafood export destinations were Hong Kong ($539 million), Japan ($269 million), China ($146 million), the United States ($64 million) and Singapore ($43 million).

Thailand, New Zealand, China, Vietnam and Malaysia are Australia's major import sources, mostly fish fillets and prawns.

(Skirtun, M, Sahlqvist, P, Curtotti, R & Hobsbawn, P, ABARES 2012, *Australian fisheries statistics 2011*, Canberra.)



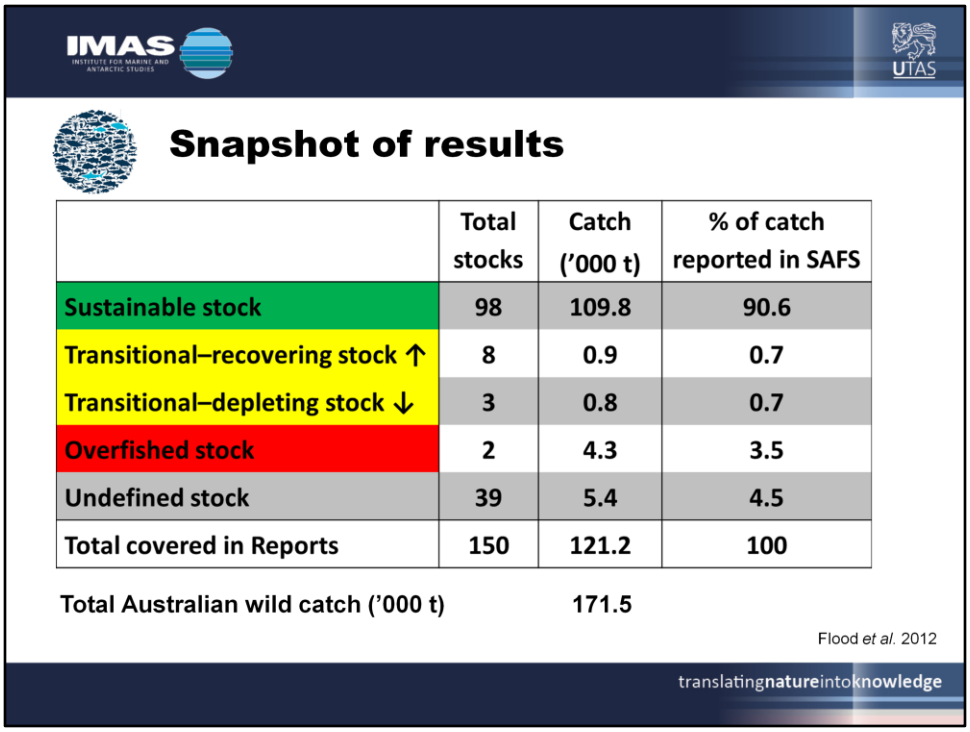
Status of Key Australian Stocks

A recently published account shows a marked improvement with only 3% of the stocks assessed being classified as overfished.

In total, 150 stock status assessments were undertaken 49 species, with assessments undertaken at the biological stock level, wherever possible.
The total volume of catch reported in the Status of key Australian fish stocks reports from Australian managed fisheries is 121 230 t. This volume represents over 70 per cent of the total Australian wild catch reported in 2009–10 (i.e. 173 340 t).

A stock status classification could be determined from 111 of the stocks assessed. The remaining 39 were classified as undefined stocks. The undefined stock classification does not necessarily mean the stock is at increased risk. It means that there is limited or conflicting information available to undertake the assessment.

(Flood, M, Stobutzki, I, Andrews, J, Begg, G, Fletcher, W, Gardner, C, Kemp, J, Moore, A, O'Brien, A, Quinn, R, Roach, J, Rowling, K, Sainsbury, K, Saunders, T, Ward, T & Winning, M (eds) 2012, *Status of key Australian fish stocks reports 2012*, Fisheries Research and Development Corporation, Canberra.)

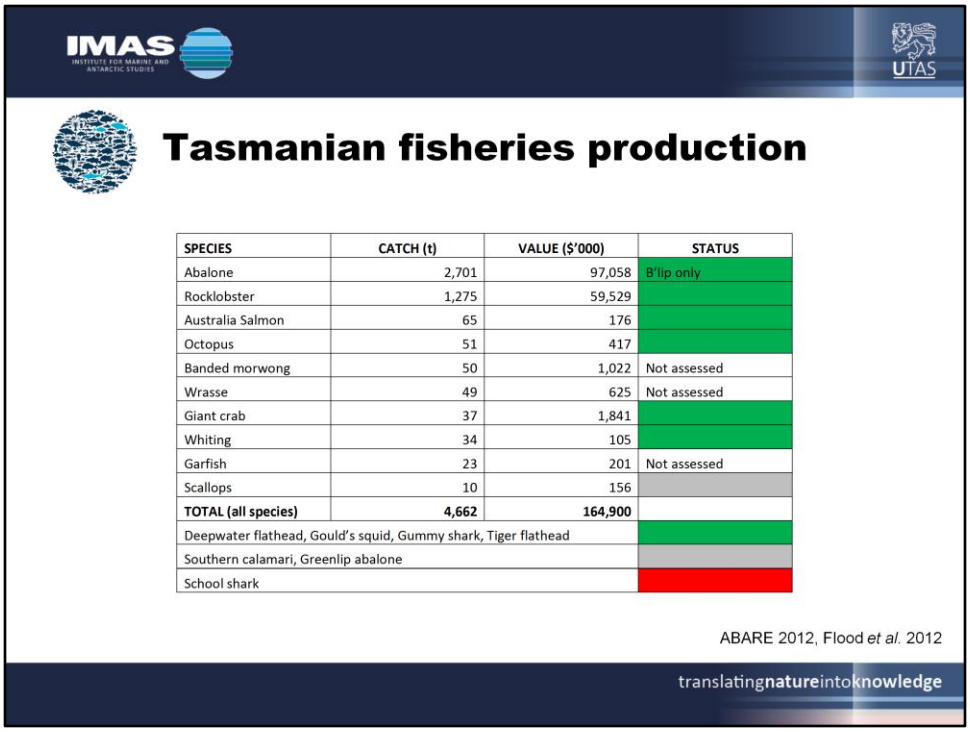


Snapshot of Australian stocks

Of the 111 stock status classifications that could be assigned, 98 stocks were assessed as being sustainable stocks, 8 transitional–recovering stocks, 3 transitional–depleting stocks, and 2 overfished stocks . The two stocks classified as overfished are the Southern Bluefin Tuna stock and the School Shark stock.

Of the Australian catch reported in the Status of Key Australian Fish Stocks Reports, 91 per cent is from sustainable stocks, less than 1 per cent is from transitional–recovering stocks, less than 1 per cent from transitional–depleting stocks, 3.5 per cent is from overfished stocks, and 4.5 per cent is from undefined stocks.

(Flood, M, Stobutzki, I, Andrews, J, Begg, G, Fletcher, W, Gardner, C, Kemp, J, Moore, A, O'Brien, A, Quinn, R, Roach, J, Rowling, K, Sainsbury, K, Saunders, T, Ward, T & Winning, M (eds) 2012, *Status of key Australian fish stocks reports 2012*, Fisheries Research and Development Corporation, Canberra.)



SPECIES	CATCH (t)	VALUE ($'000)	STATUS
Abalone	2,701	97,058	B'lip only
Rocklobster	1,275	59,529	
Australia Salmon	65	176	
Octopus	51	417	
Banded morwong	50	1,022	Not assessed
Wrasse	49	625	Not assessed
Giant crab	37	1,841	
Whiting	34	105	
Garfish	23	201	Not assessed
Scallops	10	156	
TOTAL (all species)	**4,662**	**164,900**	
Deepwater flathead, Gould's squid, Gummy shark, Tiger flathead			
Southern calamari, Greenlip abalone			
School shark			

Tasmanian species assessment

Fisheries production in Tasmania is estimated to be 4,662t pa valued at $164.9million. Over 100 species are taken in the fishery but the top ten make up more that 95% by weight and value.

Of the 13 species assessed in the National Status Report for Tasmania

- 9 were classified as sustainably fished (Australian salmon, blacklip abalone, deepwater flathead, eastern school whiting, giant crab, goulds squid, gummy shark, southern rock lobster, tiger flathead)
- 3 were undefined (southern calamari, commercial scallops, greenlip abalone)
- 1 was overfished (school shark)

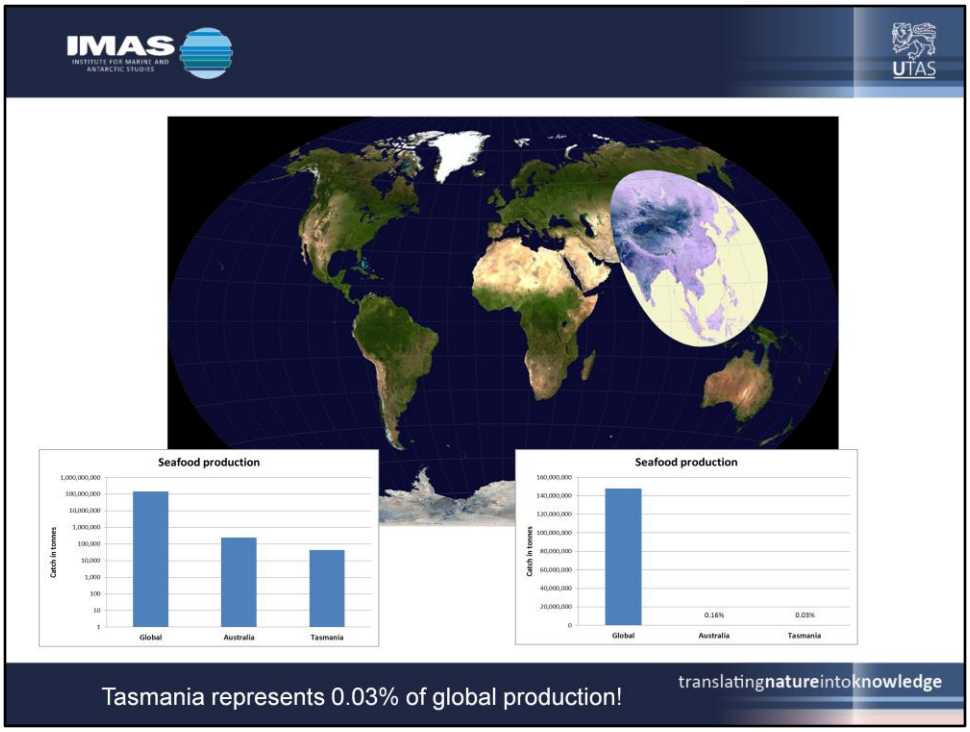
Why are three undefined? In the case of calamari and scallops the problem is that these species tend to have very unstable populations with boom / bust patterns. This makes it very difficult to assess. There are however good regulations in place that should give confidence around management (such as size limits in scallops to ensure that scallops can spawn twice before being harvested). In the case of greenlip abalone, the catch is very small and data tends to be combined with blacklip abalone (where Tasmania dominates production). Greenlip abalone is classified as sustainably fished in other jursidictions where more catch is taken (SA and WA).

Although compiled by 80 of our country's top fisheries scientists and managers it hasn't pleased everyone and is criticised on several grounds:

- Many species taken in our fishery were not assessed and in fact could not be assessed because no data exists on which to base assessments
- The criterion for assessing the status (residual spawner biomass) is debated in some circles, and perceived to be too low to meet ecological objectives
- The assessments are primarily single species assessments and do not at present include *social, economic, governance and broader environmental aspects.*

(Skirtun, M, Sahlqvist, P, Curtotti, R & Hobsbawn, P, ABARES 2012, *Australian fisheries statistics 2011*, Canberra.)

(Flood, M, Stobutzki, I, Andrews, J, Begg, G, Fletcher, W, Gardner, C, Kemp, J, Moore, A, O'Brien, A, Quinn, R, Roach, J, Rowling, K, Sainsbury, K, Saunders, T, Ward, T & Winning, M (eds) 2012, *Status of key Australian fish stocks reports 2012*, Fisheries Research and Development Corporation, Canberra.)



I would like to spend the remaining time on challenges and opportunities that confront the Tasmanian seafood industry.

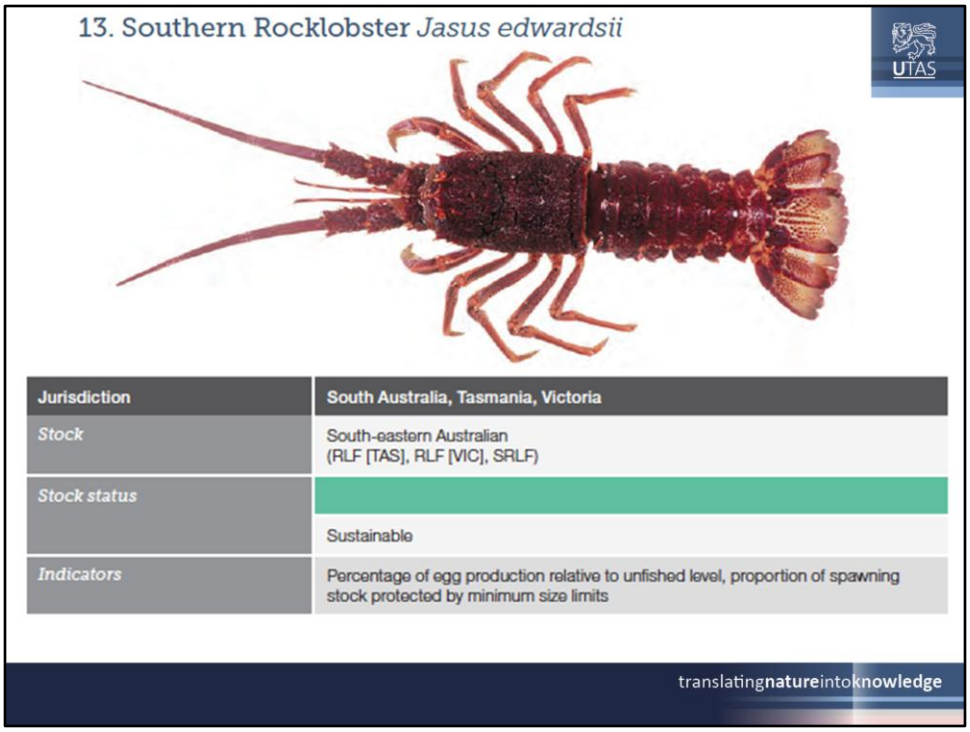
World map showing Asian circle

I was so impressed by Holge Meinke's image last month that I thought it appropriate to do the same reality check. I found the same image on the web, and although not being entirely sure of the veracity of the claim: apparently more people live inside this circle than outside of it. And as we all know they love seafood and are our major seafood trading partners. Tasmania as a seafood bowl you may be thinking?

Well here's the current situation.
Left: The relative production in Tasmania on a logarithmic scale

Right: And on a normal axis.

It sure puts things into perspective!

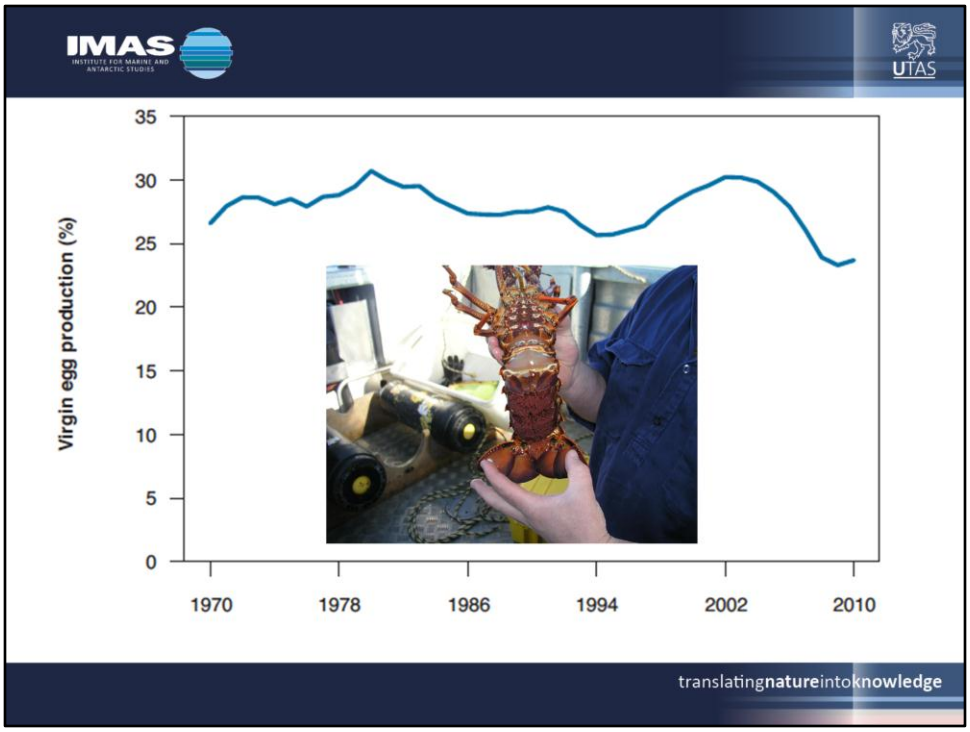


We also don't have time to delve into the detail on most all species and fisheries but I thought it would be useful to look at southern rock lobster by way of an example.

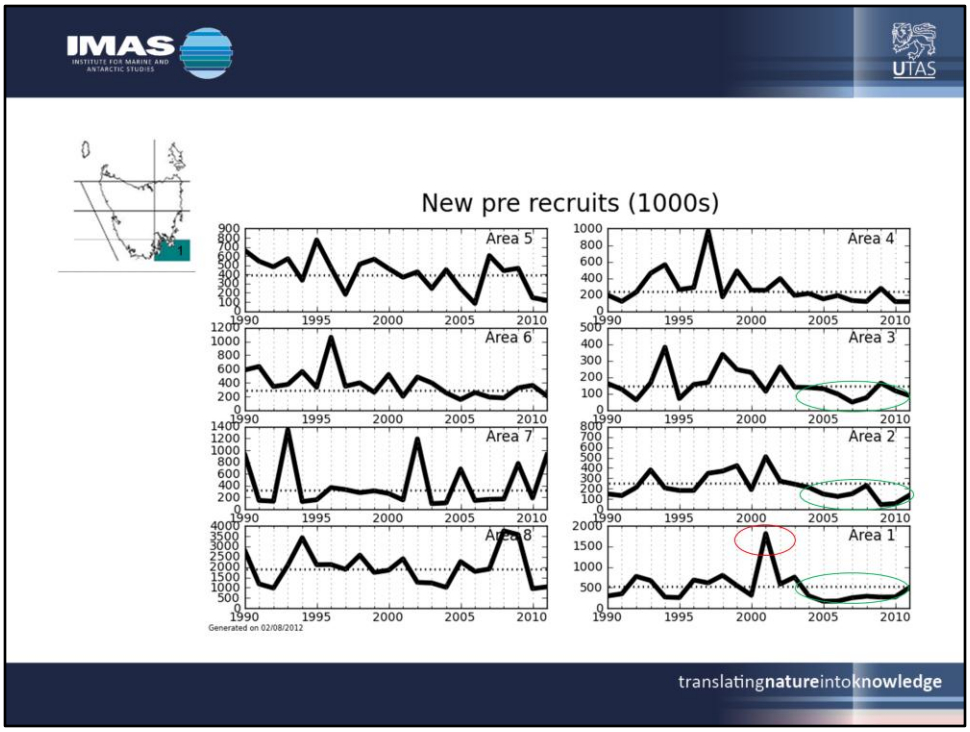
Southern Rock Lobster

Currently, approximately 1200 tonnes of lobsters are harvested annually by the commercial fishery (Hartmann et al., 2012). In addition, around 100 tonnes of lobster are caught by recreational fishers each year. While this represents less than 10% of the combined catch, the proportion of catch taken by recreational fishers in shallow waters (<20 m) along the east and south-east coasts is more significant, for instance the recreational catch represented between 22 and 35% of the shallow water catch in 2010/11 (Lyle and Tracey, 2012b).

The national status report classifies SRL as sustainably fished.

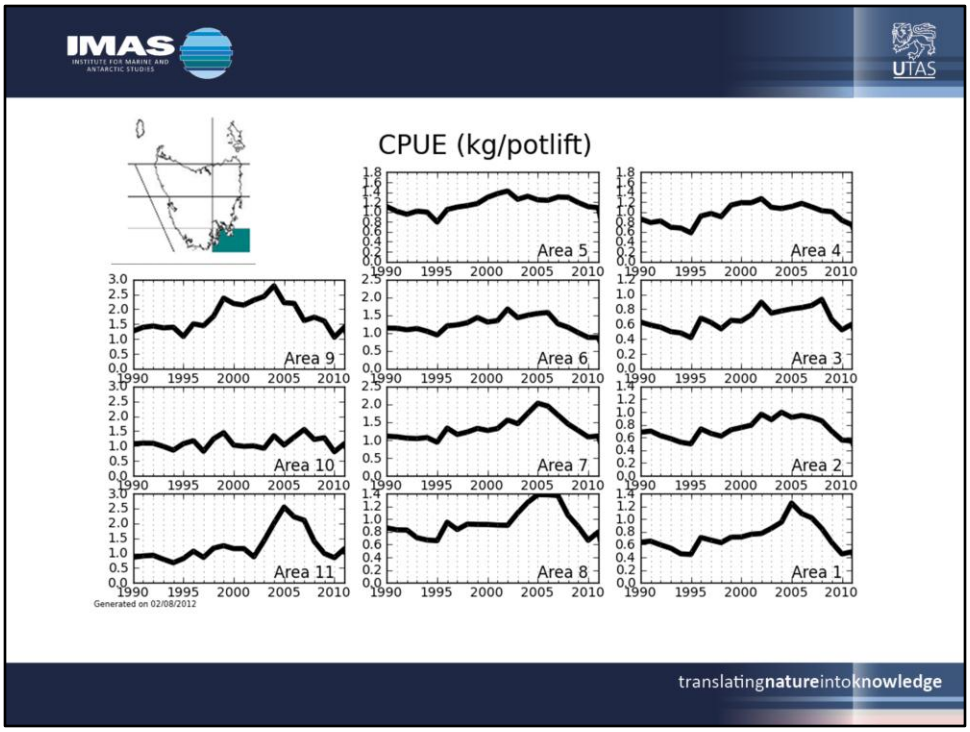


This is based on egg production, a proxy for Spawner Biomass, which is estimated to be 23% across the stock (SA, Vic, Tas) and thus above the level where recruitment overfishing would be of concern (20%). In fact in Tasmania the current estimate is 40%.



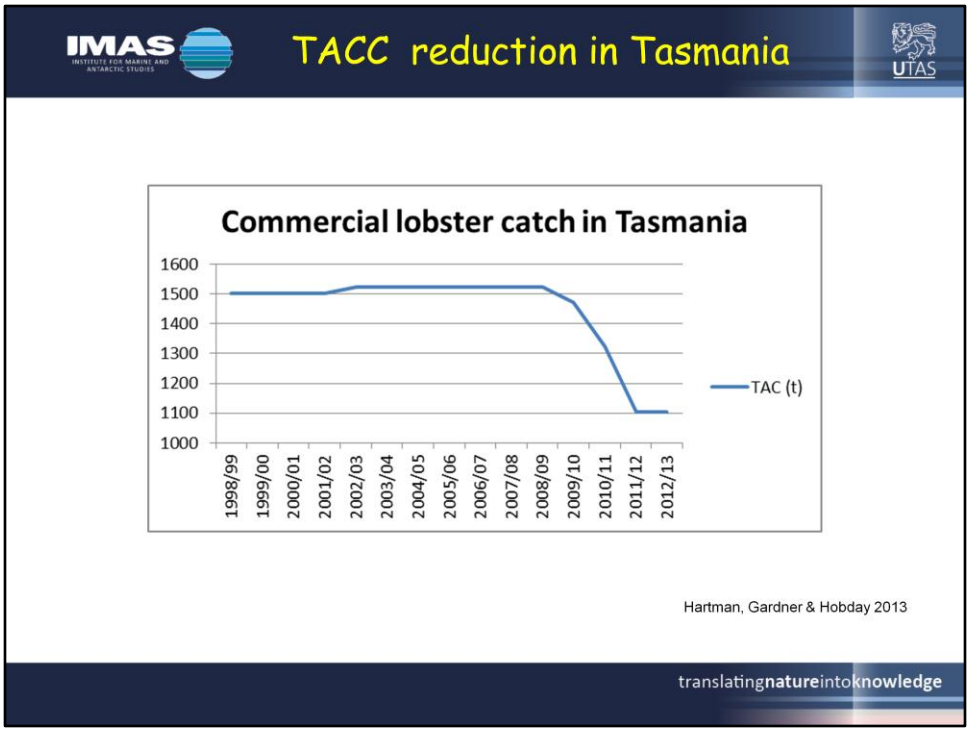
But when one looks at the situation at a somewhat finer scale one notes a large variation in recruits with good recruitment peaks in several areas eg 2001 in area 1 on the east coast – red circle

And there are obvious problems on the east coast, with unexplained low recruitment in many areas – green circles



One can track these recruit peaks in subsequent catches – the strong recruitment in 2001 was followed by a period of good CPUE up to 2005 in area 1.

And overall, when summed, the CPUE appears fairly stable across the State, but the effect on the East coast has been dramatic with catch rates falling to record lows. Currently we estimate that the biomass on the east coast is as low as 10% of the virgin state.



Industry and management have responded to this through significant reductions in TAC

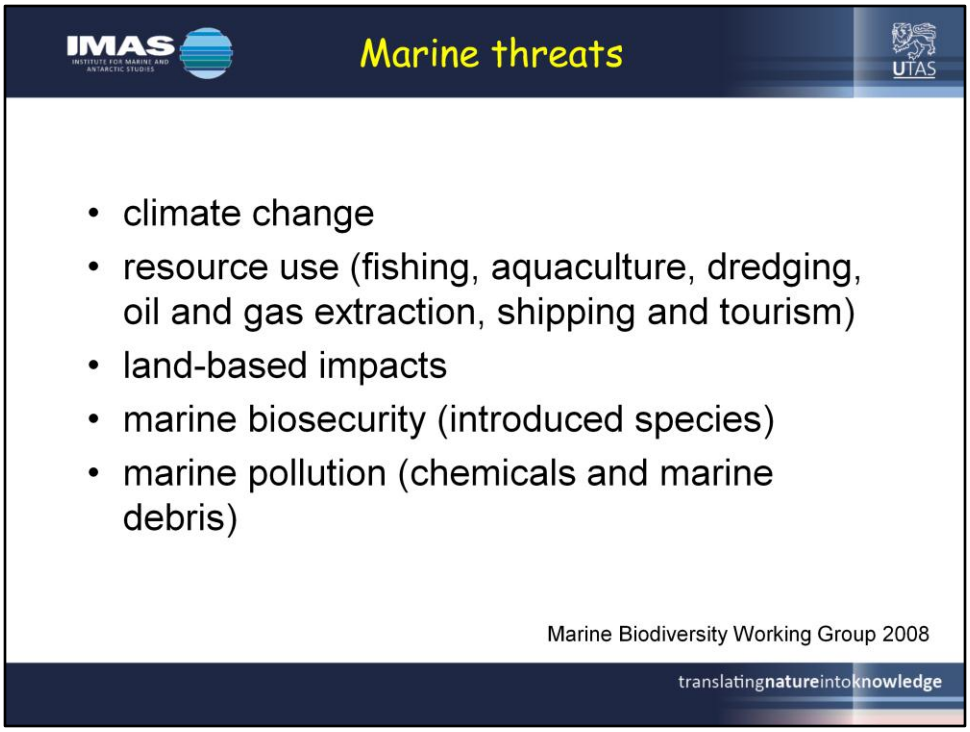
Recent declines in the stock have been matched by cuts in the total allowable catch in all jurisdictions.

So while we have measures of performance that show the fishery and stock are sustainable, there are also several challenging issues for Tas SRL that are driving decision making. We believe that existing statewide TAC management is unlikely to recover lobsters on east coast reef because of the static nature of commercial and recreational effort in that region. Whenever the stock shows any sign of recovery it is driven back because there is too much effort in the region. What we need is spatial management with regional catch caps, and I'm pleased to say that there has been a huge amount of effort into doing this over the last few years. These are heading to stable stocks and improved economic yield for both commercial and recreational fishers.

But there is a second consideration, that of the ecological health of the east coast and the threat of climate driven changes to the environment.
The jury is out on exactly what has caused the recruitment problem and one perspective is that a lack of climate drivers in the models lead to overly optimistic estimates of TAC.

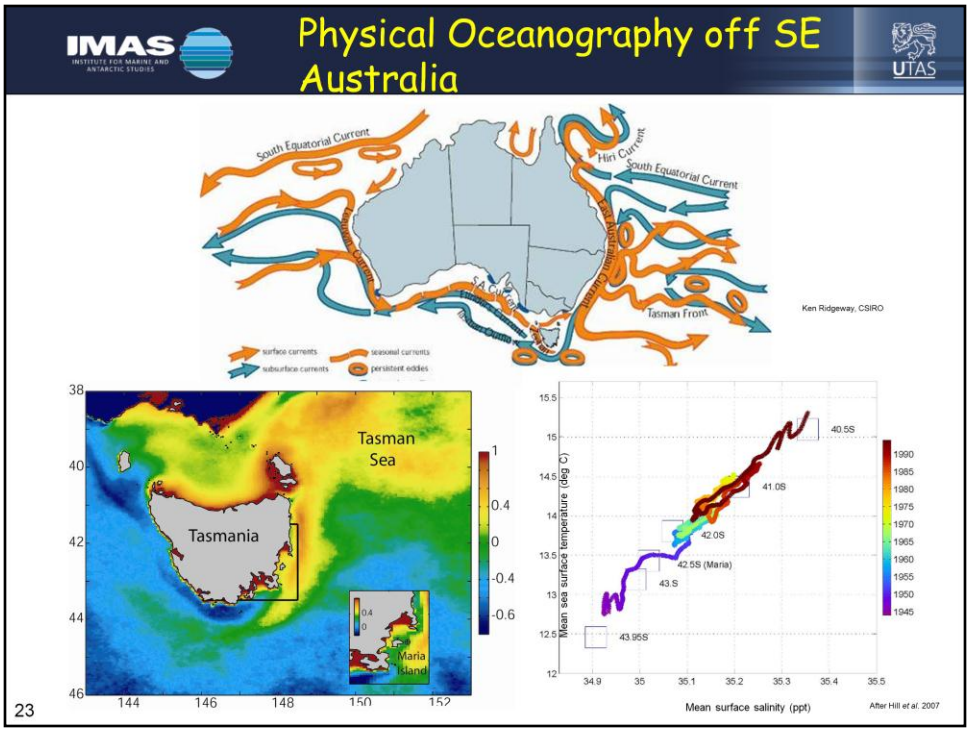
The other is a view that we lack specific objectives for local situations, do not have timely reporting and decision making frameworks and lack a clear harvest strategy.

Perhaps both contribute.



The Marine Biodiversity Decline Working Group identified five key threats to biodiversity in Australia: climate change, resource use (fishing, aquaculture, dredging, oil and gas extraction, shipping and tourism), land-based impacts, marine biosecurity (introduced species), and marine pollution (chemicals and marine debris) (Marine Biodiversity Working Group 2008). All are in fact threats to fisheries as well.

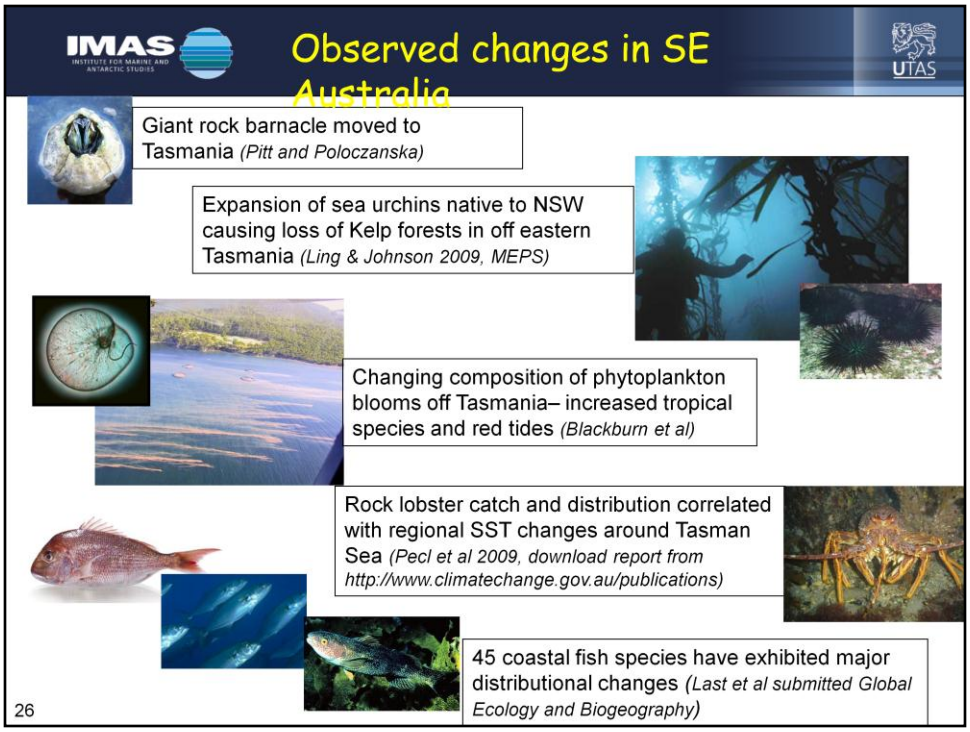
I'd like to deal briefly with one of these.



Physical Oceanography

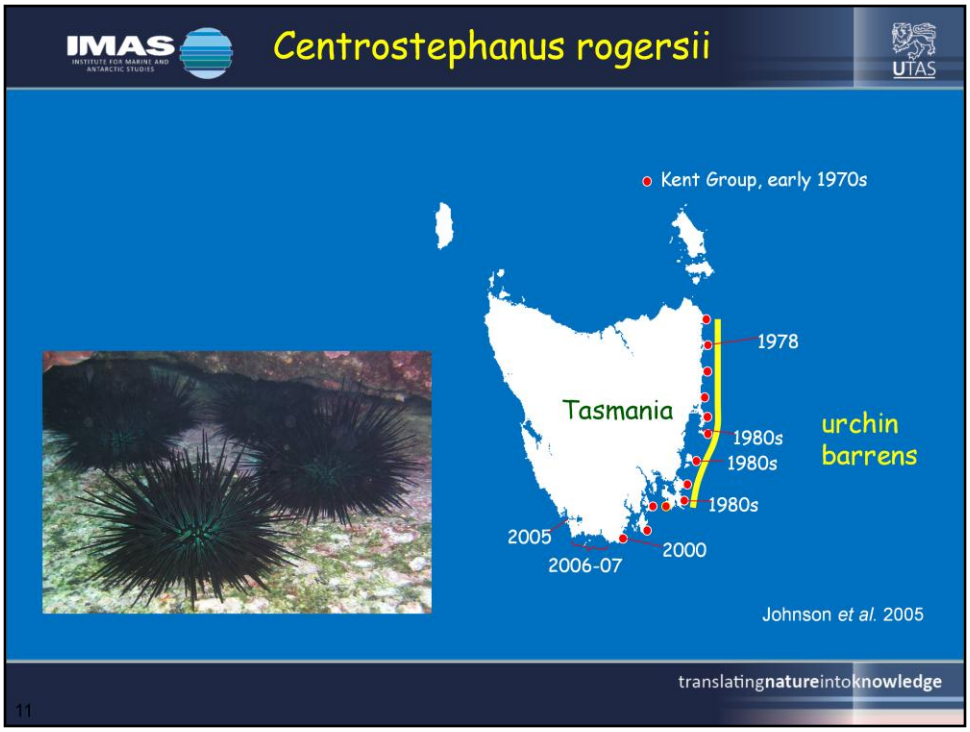
The southeast region represents an important 'gateway' between the Pacific and Indian Oceans, and an area of interaction between the East Australian Current (EAC) and sub-Antarctic water masses. The east coast is increasingly influenced by the EAC from the northeast. It's a complex system.

But observations from a long-term ocean station off eastern Tasmania show that the southward penetration of the EAC has increased over the past 60 years. The strengthening of the EAC is caused by strengthened winds over the South Pacific, and hence a stronger South Pacific gyre.



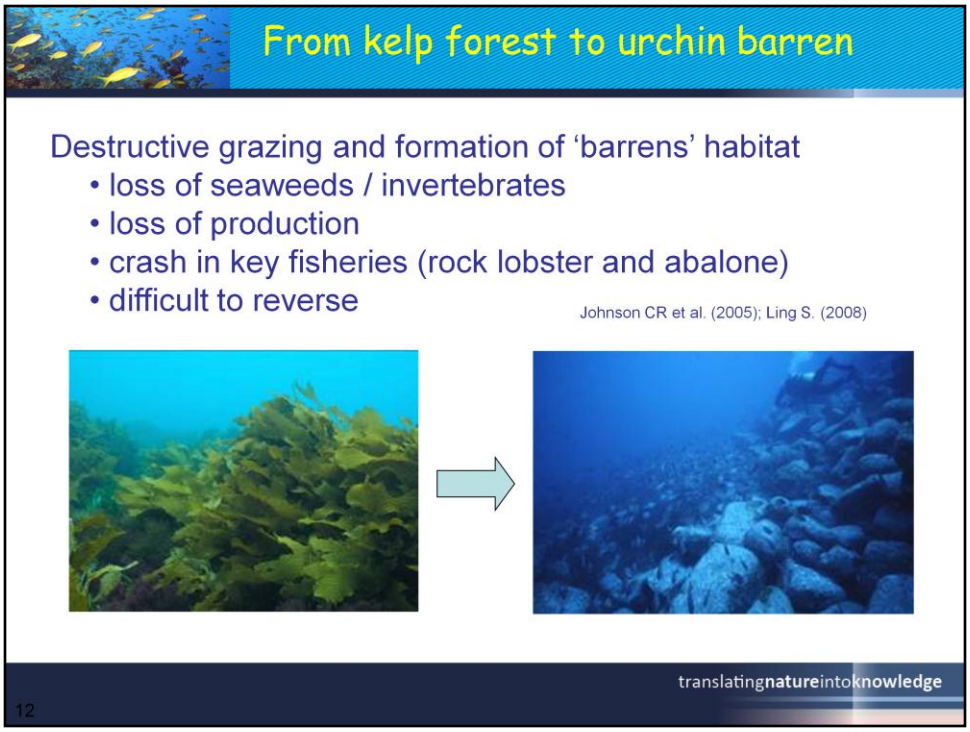
Faunal changes observed in the SE region

Changes in the oceanographic characteristics of the region have already produced changes in the marine fauna in the south-east region with several species showing southward range expansions. One being the long spined sea urchin.



Case Study - the *Centrostephanus* story

In Australia, the long spined sea urchin occurs in waters off the east coast of the mainland, but was first recorded in the Kent Group of islands north east of Tasmania in the early 70s. Since then its southward migration has been carefully documented and it is now found around the southern Tasmania as far as Port Davey (Johnson et al. 2005).

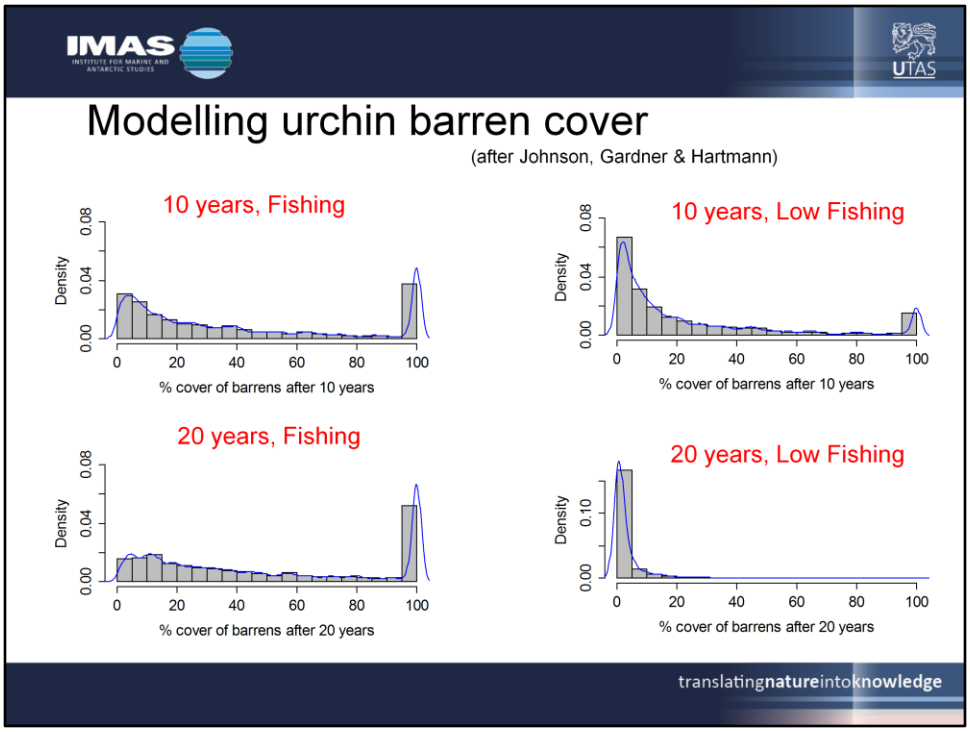


Slide 12 – Urchin barrens

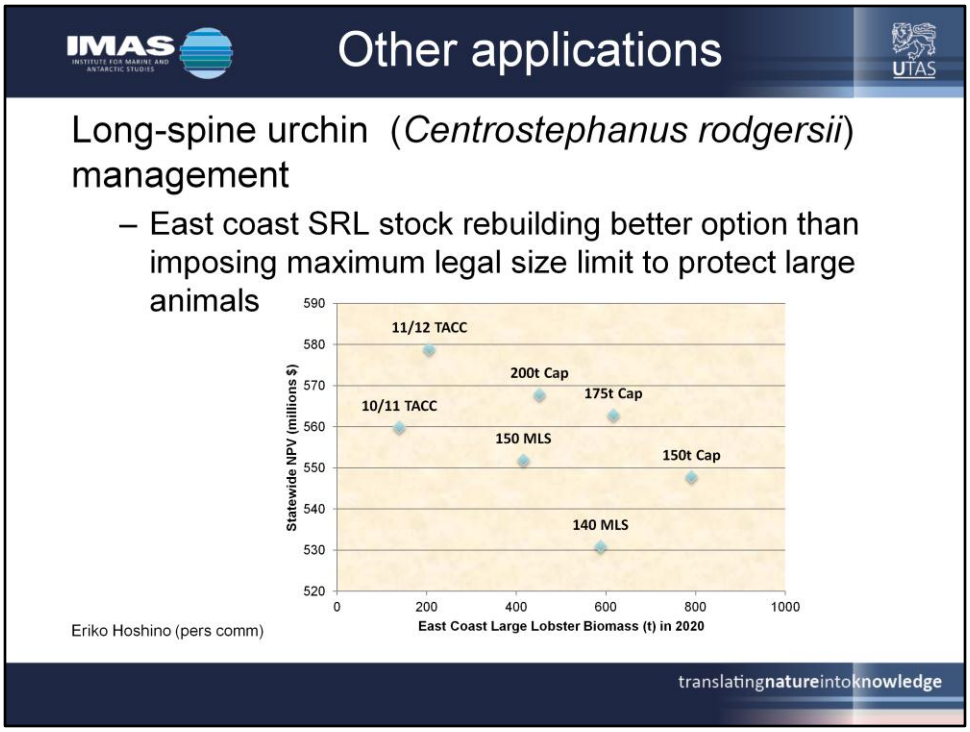
Centrostephanus is a habitat engineer which in the absence of predators is capable of deconstructing the macroalgal habitat and maintaining a simplistic and homogenous habitat through destructive over-grazing of seaweed and larval invertebrate species associated with this habitat (Ling (2008).

Ling (2008) showed that of 296 individual floral/faunal taxa recorded, only 72 were present within incipient barrens, 253 were present in the recovered patches, and 221 were present within intact macroalgal beds. Grazing activity of *C. rodgersii* results in an estimated minimum net loss of approximately 150 taxa typically associated with Tasmanian macroalgal beds in this region. Such a disproportionate effect by a single range-expanding species demonstrates that climate change may lead to unexpectedly large impacts on marine biodiversity as key habitat-modifying species undergo range modification.

The significance of this in a fishery context is that it is clear that urchin barrens are unable to support abalone (*Haliotis rubra*) and rock lobster (*Jasus edwardsii*) at levels suitable for commercial harvesting (Johnson et al. 2005).



But there is a positive story to tell, our research and modelling suggests that with the existing reductions in TAC and the proposals to introduce caps on the East Coast, we can expect a recovery in the stock and hence greater proportions of large lobsters which predate on urchins and therefore fewer barrens.



Economic options of RL management

This modelling also shows that a cap on the east coast is a better option than imposing a maximum legal size on the east coast as a means increasing the biomass of large lobsters. It also improves the catch rate thus economics of fishing on the east coast and ensures that the stock recovers to a healthy spawner biomass level.

(Slide courtesy of Eriko Hoshino)

So back to our theme.

In contemplating food security and the opportunities that we have for the future I think we should stop and reflect on the following:

- World population growth expected to reach 9 billion in 2050
- 1 in 7 people will go hungry tonight and 1 in 4 children are undernourished
- Our oceans are a vast treasure trove of resources and for a great many people food security is the first call on the marine environment
- But the oceans must be sustainably exploited if we are to achieve long and lasting benefits
- While many fisheries have been overexploited in the past the situation is improving through good fisheries management in many countries including Australia, We need to both learn from the mistakes of the past and work together to improve the performance and sustainability of this important resource.

Despite our relatively small size we have much to offer and there are many opportunities if we are just willing to take them

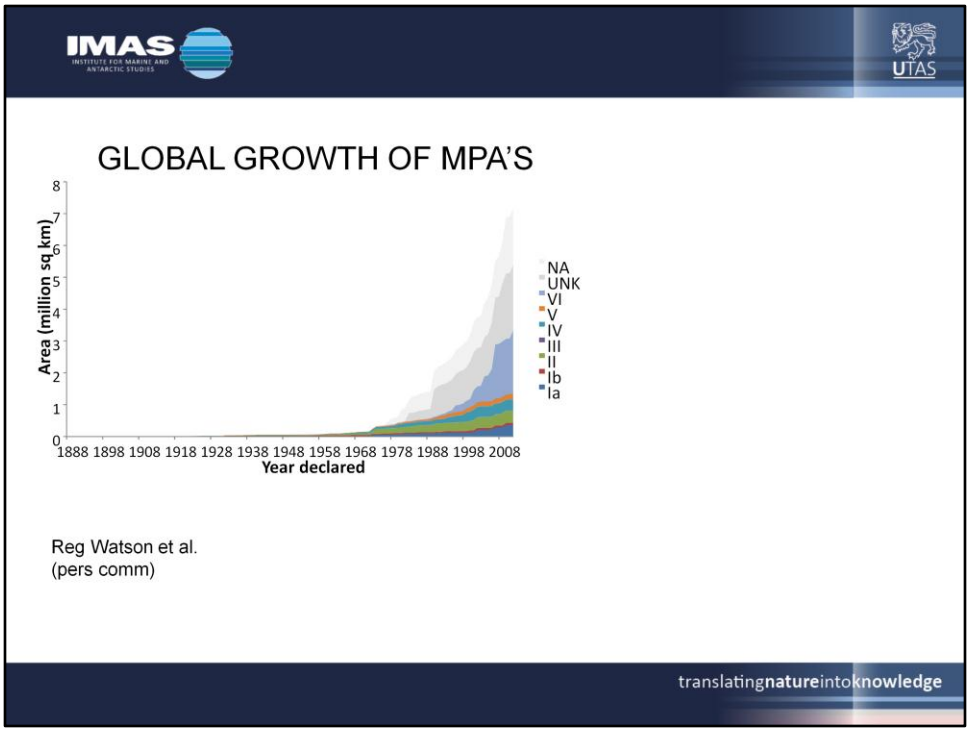
- Asian demand will grow (growth of middle class)
- Aquaculture development (lower trophic levels: mussels, seaweeds)
- Continuous Improvement and innovation in fisheries
    - Recover overfished stocks
    - EBMF

    - Fish to MEY rather than MSY
    - Underutilised and unfished stocks – myctophids, small pelagics, spider crabs
    - Intervention (reseeding, increasing primary production, artificial reef).
- We punch above our weight in research, teaching and training. We need more government and industry investment in this area if we want to stay ahead.

So to the promised return to the supertrawler…..

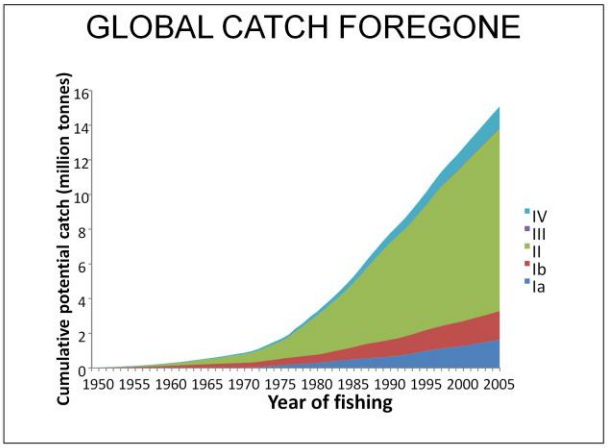
- On the one hand we appear to deny or even outright reject the sustainable exploitation of our own resources
- On the other 70% of the seafood we eat comes from imports
- We are thus happy to accommodate our demand for fish as long as it comes from somewhere else – a sort of NIMBY approach.
- And in so doing we put pressure on resources elsewhere, without contributing as much as we can to the global seafood account

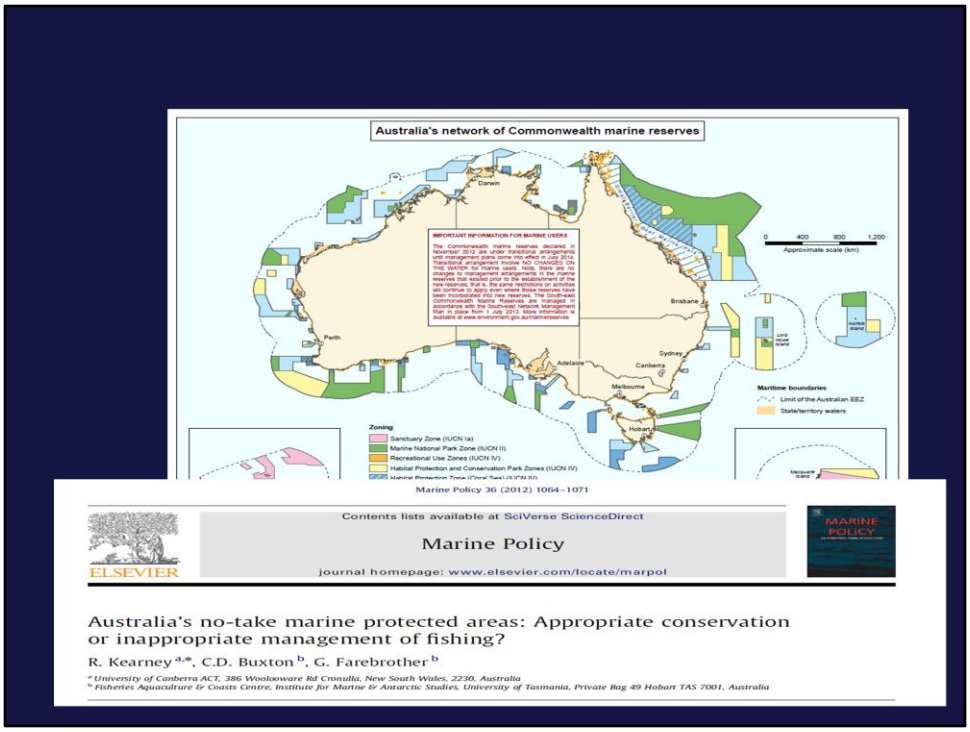
This is exacerbated by the vast tracts of ocean that are now locking the fishing industry out, even if the fisheries are demonstrably sustainable.



Here we have illustrated the growth of MPAs worldwide and in the next slide calculated the foregone catch as a consequence of this action.

(Slides courtesy of Reg Watson)


GLOBAL CATCH FOREGONE
Cumulative potential catch (million tonnes)
0
2
4
6
8
10
12
14
16
1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005
Year of fishing
IV
III
II
Ib
Ia



And I'll leave you with this thought – many will have read that the status of the Great Barrier Reef has recently been downgraded from Moderate to Poor – this our living treasure and national icon. What surprises us is that this is one of the largest marine protected areas in the world, with as much as 30% no-take in their system.

It suggests to me that the MPA is not working, we are targeting the wrong threat or the MPA simply isn't addressing the threats at all.

Fishing is the easy target. The only thing that we do in creating no-take MPAs is to cease fishing, and we do it when it is neither clear that fishing is a threat or that marine fisheries and/or the broadscale environment will benefit from the closures. There is furthermore no evaluation of MPAs as cost effective management tool – something that our legislation requires.

We should take a long hard look at the NRSMPA and ask what it is doing to address the marine threats to our oceans and to fishing itself. Do we need such vast tracts closed to fishing? Are they addressing the major threats? And can we afford them in the context of food security?

I HOPE I HAVE GIVEN YOU SEAFOOD FOR THOUGHT - THANK YOU!

Acknowledgements

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