

The Western Rock Lobster Fishery (WRLF)

Overfished or over managed?

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Executive Summary

- The long term performance of the WRLF shows no indication of overfishing nor is there any reason to expect it.
- In view of high natural variability in puerulus numbers, substantial breeding stock not being harvested and reports from fishermen of abundant undersize stocks, the most reasonable management strategy would appear to be to continue fishing at 2007/08 level of effort so long as good catches maintain. Unless catches fall below recent (35 year) lower limits of variability (i.e. about 7,000t), reductions in effort are unwarranted.
- Claimed high depletion rates are unlikely and not in accord with catch performance. This would have to drop markedly toward the end of a fishing season at such high depletion. High depletion is also strongly contra-indicated by very low tagging returns.
- The claim by management of steadily increasing efficiency resulting in larger catches is unspecified, unreasonable and unsupported by any evidence. The most recent significant change, adoption of GPS occurred well over a decade ago.
- Although catchability and increased efficiency are real phenomena, so too are large natural fluctuations in recruitment. To use the former to deny the latter is politics not science.
- Differences in the fishery between the different fishing zones makes greater separation of industry representation and management measures appear desirable.
- There is no trend of declining catches and clear evidence of abundant breeding stocks. The harvest rate is lower than most other lobster fisheries and the population density appears to be higher than most.
- The claims made (Reid, 3009) in proposing a change in management aim from Maximum Sustained Yield to Maximum Economic Yield are inconsistent with the actual performance of the fishery which is one of the most profitable. It appears clear that the real aim is further downsizing of the industry with expanded management responsibility and authority. Claims made by DoF in advocating MEY would, if presented in an investment prospectus, invite criminal charges from ASIC.
- Quotas will eliminate good catch years and primarily benefit less productive fishermen while curtailing the most productive. The history of quotas in other Australian fisheries has typically been one of ongoing cutbacks with large costs to buy more quota and the most lucrative resources becoming increasingly owned by investors and corporations.
- Australian fisheries management can be accurately characterised as being the most costly, demanding and restrictive in the world with the least productive outcomes. The good news is that as the industry downsizes from over regulation all this expensive management won't be needed either.
- MPAs are a hypothetical solution to an imaginary problem. They have not proved to be an important management tool in any of the world's well managed fisheries. Their wide implementation amounts to large scale environmental meddling with no clear idea of efficacy or consequences.
- The increasing reliance on unverified modelling inaccessible to independent examination is a violation of both good scientific practice and accepted principles of forecasting. It is too unreliable for sound management decision making and presents a critical risk to the industry. The precautionary principle itself would preclude its use. Addressing this matter should be an industry priority.
- Resiliency of the industry to cope with the changing socio-economic environment has become seriously impeded by the costs, demands and restrictions imposed by management.
- The WRLF now faces a cost/credit/labour/demand crunch. An industry report on improving their economic efficiency states clearly: *"If the industry wishes to maintain or improve its current rate of return, we need to find a management package to allow us to re-structure input costs..."*

In the current and foreseeable global economic climate we can no longer afford the luxury of ever increasing costs for management which only delivers ever diminishing production and profitability.

Only the private productive sector can produce the permanent jobs, products and profits necessary for a healthy recovery. To do so producers must have a much stronger role in regulatory decision making and the bureaucracy is going to have to be made accountable for productive outcomes. At minimum, management costs should be limited to a decided upon percentage of production.

The electorate is becoming aware of the threat they personally face from the burden of over-regulation and bloated government. With government clueless and floundering, producers have a much improved chance to be heard.

The marine communities upon which our fisheries are based are not fragile and delicate, They are robust and flexible. They readily recover from frequent natural perturbations. There is little risk in monitoring fisheries performance and addressing problems if and when they become apparent, rather than trying to take elaborate pre-emptive action to avoid an endless array of imaginary possibilities.

In general, a much more empirically based approach is needed. Management decisions should be based primarily on what is actually happening in a fishery, not theories and models. Such reforms are eminently practical, in accord with fundamental democratic rights and good management practice. The only real requirement for their implementation is the will to do so.

It is past time for the electorate to realise that we are all paying the price of gross resource mismanagement in our cost of living, our health, our freedom and in the broader well being of the nation.

Introduction

Australian fisheries management is often claimed to be the best in the world. However, such claims only come from the managers themselves and it is difficult for a dispassionate observer to reconcile “best” with outcomes that are the most restricted, most costly and least productive in the world. It is even hard to imagine that “best” might refer to sustainability when the same managers are constantly claiming a need for additional restrictions to address overfishing. After all, if overfishing is indeed occurring, it has done so under their own management.

The WRLF is Australia's most valuable fishery and is claimed to be the best managed lobster fishery in the world. In this instance “best managed” may at least be correctly understood to mean most. However, despite it's long standing high profit status, this fishery too has reached a breaking point for many operators. The cumulative burden of ever increasing management imposed costs and restrictions plus large debts incurred to buy additional pot licenses at uneconomic “bubble” prices is no longer bearable for increasing numbers of fishermen. Worse yet, ongoing restrictions are now collapsing pot prices and the devalued equity is likely to prompt banks to start calling in loans they deem to have become doubtful.

Incidentally, the title of Australia's most valuable best managed fishery used to be accorded to the Northern Trawl Fishery. With major help from management it is has been reduced to less than 50 vessels, all operating at a loss. Vessels, licenses and quotas are on offer at fire sale prices with no buyers. It is remarkable what the world's best management can achieve.

WRLF Industry Performance

The overall performance of the industry from 1973 – 2008 has remained good while moderately increasing:

- Average total annual catch the 10 years from 1973 - 1982 was 9.9 t. From 1999 - 2008 it was 11.3 t, a 14% increase.
- Average catch per pot from 1973-1982 was 140 Kg. From 1999-2008 it was 164 Kg, a 17% increase.
- Total catch for all years from 1973 - 2008 ranged from 7.2 t to 14.4 t, a 2 fold difference.
- Fishermen's price per Kg from 1973 – 2008 ranged from \$2.60 in 1973 to \$31.50 in 1998. 2008 price was\$24.00.

- Total earnings from 1973 – 2008 ranged from \$18.9 million in 1973 to \$367 million in 2000. 2008 earnings were \$211 million.

Some Key Management Issues

Low Puerulus Counts and Stock Assessment –

Sampling the numbers of new juvenile lobster recruits (puerulus) in near shore areas is used as a management tool to predict stock sizes 3 to 4 years later when they have grown to a size to be caught by the fishery. Although the correlation of puerulus numbers with later catches is generally positive the variability in numbers is proportionately much greater than is the variability in the related catch and occasional years even show moderate negative correlation. The puerulus indicator for all years from 1973 - 2008 ranged from 10 - 215, a 21 fold difference while the total catch only varied two fold from 7.2 to 14.4 t.

Both rises and falls in puerulus numbers and subsequent catches tend to take place over several successive years. However, as low puerulus counts have been used as a basis for increased restrictions on fishing effort, reduced catches following low counts are to some extent self-fulfilling prophesy. Unfortunately, catch data does not appear to have been used to assess what portion of reduced catches may be attributable to restricted effort and how much to poorer catches per trap. Current restrictions on fishing days per week further confuse the picture as no assessment has been made of the effect on catch of leaving a trap set for several days versus pulling and rebaiting it daily. Better understanding of catch/effort relationships is required before informed effort controls are possible. Current restrictions amount to seat-of-the-pants guesses with no real evidence of need, appropriateness or results.

A sudden fall in puerulus numbers occurred in 2006/07. This was followed by further falls in 2007/08 to a record low in 2008/09. This has resulted in a projected catch of 7,200t in the 2010/11 season and would be the lowest catch in the previous half century. However, this figure is entirely based on population projections from the low puerulus counts compounded by reductions in effort to be imposed because of these estimates. However, these low projections are conflicted by reports from fishermen of abundant juvenile crayfish in various areas and the portion of undersize ones in the current catch which has also remained excellent on a catch/pot/day basis. As these smaller animals are the ones that will be entering the fishery over the next two years there is reason to suspect that the low puerulus counts may reflect some change in juvenile settlement from inshore areas where the counts are made to areas further offshore.

It has been suggested that the current low counts are most likely related to unspecified “long term” changes in oceanographic conditions. Past and current low puerulus events correlate well with positive phase Indian Ocean Dipole events. These are known to have a marked effect on regional weather, ocean conditions and fisheries elsewhere in the Indian Ocean. In Western Australia positive dipole events bring drought, easterly winds, oceanic upwelling, a weakening in the Leeuwin Current and cooler ocean temperatures. These conditions are adverse to high puerulus numbers.

Normally IOD events last only a season and occur at irregular intervals every few years. The current repetition of positive dipole events in three successive years has not previously occurred over the few decades of IOD observation. How unusual this may be is unknown. One climate model study suggests that three consecutive IOD events may occur twice in a thousand years. A “long term” oceanographic change is entirely speculative. On the basis of available IOD evidence, return to a

neutral condition by next year would seem most probable. This may already have occurred. NW Shelf fishermen report that water temperatures have increased dramatically over last year at this time.

While puerulus counts are an important indicator, they are a good but not sufficient tool in themselves alone to provide a sound basis for management. They are too variable in relation to resultant fished stocks. Relying on an uncertain indicator modulated by a subsequent three to four years of variable unknown influences to estimate a condition which can readily be monitored directly as it develops is risky management. It amounts to looking at where you were headed three to four years ago to estimate where you should be now, without looking around you to make sure.

There would be little risk and far greater certainty in placing more emphasis on management by direct real world, real time assessment rather than projections from puerulus counts and unverified models. Direct population counts by diving and night video transects would be worth exploring. A much larger tagging effort would also seem most valuable. Certainly, more attention could be given to near real time monitoring of catch data. Good catches have to mean good stock levels. Fishermen can't catch what doesn't exist.

Depletion Rates -

Depletion rates from the effect of the fishery are estimated as being 85% in zone A, 80% in zone B and 70% in zone C (Caputi *et al.* 2008). This seems very high. If real, one would then expect a marked decline in both populations and catches toward the end of each fishing season. Actual catches and observations by divers indicate a much lower depletion rate. Most tellingly, tag returns of only 8 from 367 tagged animals (*i.e.* 2.2% recapture) suggest a much lower depletion rate.

In addition, there are also large areas that are unfished or little fished because cray abundance there is too sparse to yield worthwhile catches. Nevertheless, the unfished population over such areas may still be quite large in total.

The probability of error in estimates based on complex interactive models involving numerous assumptions and estimates is high. Verification of results by direct methods such as catches, diving or video based surveys is essential.

Reliance on unverified models is a recipe for disaster. Reliance on unverified financial risk modelling played a major part in the current global economic recession. Some of the best brains in computer modelling and mathematics were employed by the major financial institutions to model risk in the derivatives market. David X. Li, a brilliant Chinese mathematician, "solved" the apparently intractable problem of correlated risks by using a Gaussian copula function to greatly simplify what was otherwise an impossibly complex morass of interrelations. After he published his seminal paper, other quantitative analysts quickly agreed and the subprime mortgage backed security bubble rapidly inflated. The rest is now the still unfolding history of the great global economic crash of 2008 until nobody knows when.

The problems being modelled in both high finance and the population dynamics of fisheries are similar in complexity and uncertainty. However, the former still failed disastrously despite having unlimited resources and the best talent in the world.

As (under)stated in the 2007 Western Rock Lobster Stock Assessment and Harvest Strategy Workshop with regard to depletion study, *“precision might be improved”*.

Increasing Efficiency -

As also (under)stated in the same 2007 workshop report, *“Efficiency increases are not based on rigorous recent estimates.”* It might be added that efficiency increases have never been based on rigorous estimates but have only been based on estimates as desired to explain away discrepancies between modelled predictions and actual catches.

It is well known that the long planktonic larval stage of lobsters make their recruitment highly susceptible to variables in oceanic conditions. Lobster fisheries everywhere are characterised by large erratic inter-annual fluctuations. Still, WRLF management has been strangely reluctant to attribute decreases in catch to anything other than overfishing and increases to anything other than increasing efficiency. Unlike all other lobster fisheries the WRLF is apparently never expected to have good years. Whether catch increases or it decreases, it's evidence of overfishing and more restrictions are called for.

While bigger faster boats, hydraulic pullers and improvements in navigation equipment and depth sounders have unquestionably made life easier for fishermen the effect on catch per trap has been much less. As noted above the average catch per pot in 1973-82 increased only 17% in 1999-2008. Average puerulus counts over the same periods increased by 75%. How much of the 17% increase in catch per pot (or 14% increase in total catch) is attributable to increased efficiency and how much to a natural population increase is highly uncertain.

The only certainty is that a steady ongoing increase in efficiency of 1-2% a year has no evidential basis but is only a figure pulled from someone's nether region to suit their purpose.

Catchability -

Crayfish catches often vary widely from one day to another in accord with weather and sea conditions. Temperature, lunar phase, migratory activity, bait and repeated fishing in the same location also affect catchability. Fishermen have long been aware of these influences and use them to advantage when possible. Fishery managers have recently discovered catchability to be a convenient alternative explanation for improved catches when claims of increased efficiency might risk a need to explain.

Although catchability and increased efficiency are real phenomena, so too are large natural fluctuations in recruitment. To use the former to deny the latter is politics not science. A rigorous assessment of these effects is an obvious management deficiency requiring attention.

Zoning –

There are significant differences in the fishery between the different fishing zones. Management measures that may be desirable in one area can be undesirable in another. Consideration needs to be given to greater separation of industry representation and of the management measures imposed on different zones.

Overfishing -

Despite ongoing concerns, the long term performance of the fishery shows no evidence of overfishing nor is there any reason to expect it. The WRLF harvest rate per unit of area is lower

than most other lobster fisheries and the population density (as evidenced by the catch per trap pull) is higher than most.

Maximum Economic Yield -

Reid (2009) has advocated changing the aim of managing the WRLF from Maximum Sustainable Yield (MSY) to Maximum Economic Yield (MEY). Quotes from and considerations on some key points of this proposal are:

- *"...targeting catch and effort at MEY will always ensure that profits are maximised."*

This assumes that targeting of MEY by managers will always be entirely successful despite unpredictable events and the absence of any special economic competence on the part of management. This is an extraordinary claim. If true, they should be at Treasury not Fisheries WA, or better yet, the World Bank.

- *"With a biological target of MSY alone, however, it is quite possible that profits will be very small or even zero."*

This is only a hypothetical possibility that would be rarely found in actual practice and is obviously untrue for the WRLF.

- *"The results of the analysis presented in Section 2 indicate that potentially fishery profitability could be significantly improved if the level of effort in the fishery was significantly lower than that which prevailed in 2007/08."*

This is a highly dubious assertion inconsistent with the long track record of profitability under the existing management aim. Large increases in profitability would be necessary to offset the large reduction in total catch needed to effect the implied increase in CPUE. Reduced fuel use would be the only real saving as most other costs are fixed. None of this even mentions the broader socio-economic impacts of a downsized industry on the fishing communities and reduced exports further contributing to an already chronic and unsustainable national trade deficit.

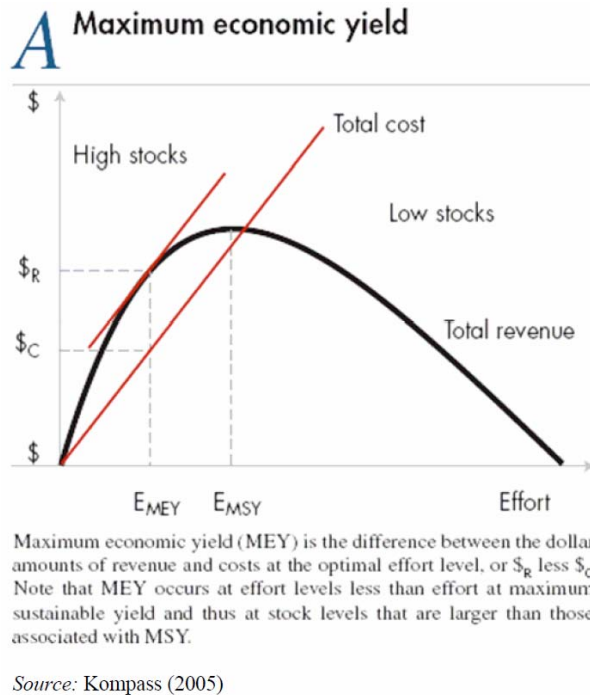
- *"However, as previously mentioned for the potential profits associated with MEY to be realised requires not only that the appropriate management targets be set correctly but that, among other things, the management regime under which the targets are set provide incentives compatible with the objective of maximising the fishery's profitability as a whole."*

This is only high sounding bureau-blather promising results outside both their mandate and their competence to deliver.

- *"Thus, in order for the fishery to remain at MEY a manager relying on input controls must frequently assess the level of effort associated with MEY as effort changes and adjust the input controls to return the fishery to MEY."*

What is clearly being suggested is an aim for total management control through central planning by the bureaucracy. Soviet Russia and Maoist China tried this on a vast scale for decades with disastrous results.

The MEY graph on p.2 and Fig.1 (p.4) of this study (Reid, 2009) are particularly misleading.



Both graphs are entirely hypothetical. The real world relation between catch, effort and cost is highly variable from one fishery to another as well as over time and between fishermen in the same fishery. In particular the MEY graph suggest a linear increase in cost with increasing effort when the WRLF has high fixed costs a significant portion of which are in fact imposed by management. Spread over the number of days of effort these costs decrease proportionately with increasing effort.

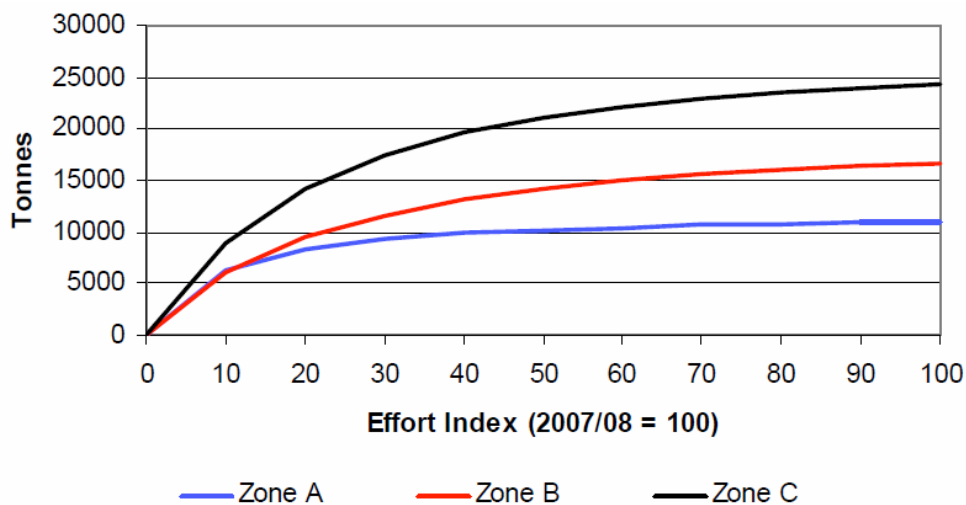


Figure 1: Predicted total catch over the period 2008/09 to 2013/14 seasons under various effort levels

Fig. 2 is equally misleading. It indicates that a 50% reduction in effort would only result in a reduction in catch of 10% to 15%. In other words, if you halved the number of fishing days or halved the number of traps, the total catch would only fall by 10-15%. Or, if you halved the number of boats and traps the catch per boat would increase by 70–80%. If this is true the 2009

reduction in fishing days to 4 days per week should have only reduces the catch for that time by less than 10%.

If made in an investment prospectus, the claims made in this purported "Analysis" would invite criminal charges from ASIC. Does the industry really want to turn over economic decision making to these people?

If Fisheries WA genuinely think they can improve profitability, perhaps the industry should make them a fair offer. Why not a joint venture between the industry and the managers in which management is answerable to a board of directors with proportional representation by the industry and with the budget and remuneration of management indexed to the resultant productivity and profitability of the industry? Certainly this would be unarguably fair and a distinct improvement over the present system in which management is unaccountable for any outcomes and where management costs steadily increase while resultant production and profits decrease.

Introduction of Quotas -

Introduction of quotas are desirable to management as they permit direct control of outcomes. This would make management predictions self-fulfilling and avoid the messy appearance of real world outcomes which are too often contrary to aims and predictions.

The real world experience of quotas in Australian fisheries has presented a number of problems for fishermen. These seem have been ignored thus far in debate regarding the WRLF but warrant careful consideration:

- Fishing like farming is characterised by good and bad years. Good years permit surviving bad years. Quotas cut off good harvests. They have no effect on bad years.
- Fishing is also characterised by good and poor fishermen. Quotas curtail the operations of the most efficient fishers and permit the less efficient to do more thus reducing the efficiency of the industry as a whole.
- The repeated experience here has been generous quotas to get the mugs into the tent, followed by ongoing cutbacks once quotas are in place. This forces marginal fishermen to give up and good ones to bear large additional costs through having to buy or lease more quota.
- Quota bought at an economically viable price runs a high risk of being rendered uneconomic by further reductions.
- Absentee investor/owners and companies are favoured by quotas as they provide a captive market for the sale and lease of their quota and extra fishing days for their generally less efficient share cropper captains if they have their own vessels.
- Tradeable licences and quotas tend to result in the most valuable fisheries becoming increasingly owned by a few investors and/or companies.

After a thousands years of struggle to escape serfdom and 200 years of economic freedom, welcome back to the new middle ages.

An interesting additional question with quotas is, would pot licenses be converted to quota? If so, would there then be no limit on trap numbers? If not, and pot licenses were maintained would they trade separately? This matter presents some wonderful potential for bureaucratic complexity and paper trading. Think about the possibilities for cray futures contracts or perhaps even credit default swaps to cover losses from poor catches. With some development, the whole thing could

become a much bigger market than the actual catch. Who knows, the latter might even be dispensed with entirely.

Finally, one of the paramount advantages to quotas is always said to be that they eliminate the “race to fish”. However, this claim is never detailed as to why it will do so and why this would be desirable or whether there is any problem in this regard in the first place. In all of the world’s most productive economies, open competition is a major contributing factor. On the other hand, government sponsored monopolies have a dismal record of failure. The idea that competitive productivity is so obviously undesirable it needs no discussion, reflects more a sheltered workshop public service mindset than it does progressive management. With regard to the WRLF in particular, the use of quotas to end the “the race to fish” is only another hypothetical solution to a problem which doesn’t exist.

Should the decision be made to go to quota the advice of Gardner (2008) should at least be heeded: *“If quota is introduced, I’d suggest reducing input controls as much and as soon as possible. They increase costs and the WRL fishery needs costs reduction sooner rather than later. Input controls are often retained to provide security against a quota set too high. While there is a need for cautious management, this is better served by setting a cautiously low quota rather than retention of input controls.”*

Over Regulation –

Although the WRLF is claimed to be the best managed lobster fishery in the world, this is a self awarded claim of excellence by the managers themselves for which no evidence is offered. In general, Australian fisheries management can be accurately characterised as being the most costly, demanding and restrictive in the world with the least productive outcomes. Great attention is directed to sustainability but virtually none to productivity or profitability which are widely in decline while management costs continue to increase. Resource sustainability alone is a no-brainer. All that is required is to load on the costs, demands and restrictions. The more the industry declines, the more sustainable the resource becomes.

Genuine resource management, however, aims to maximise productivity and profitability within the limits of sustainability. This is considerably more difficult and is far from what has been achieved. The real world result of our management has been the world's lowest fishing harvest rate at 1/30 the global average and having to import two-thirds of an only modest domestic seafood consumption. This is despite our having the largest fishing area *per capita* of any continental nation.

The WRLF has enjoyed the advantage of being a valuable and well established fishery before the recent era in resource management of bureaucratic proliferation, political pandering for green votes and the rising influence of eco-salvationist ideology. Being already fully established and operating sustainably provided some relief from the hypothetical concerns and precautionary measures that have stunted and strangled less developed sectors. This advantage, however, has been only relative and temporary. The WRLF now suffers under various restrictions of dubious merit and their cumulative burden is increasing. It can also expect to receive increasing attention as other less profitable fisheries are managed into extinction and a bloated bureaucracy turns increasing attention to surviving sectors.

The good news is that as the fishing industry downsizes from over regulation all this expensive

management won't be needed either. Recently Fisheries NSW announced significant staff cuts in response to budget reductions. For state governments facing large falls in revenue, expanded fisheries departments managing downsized fisheries will be obvious candidates for cutbacks.

MPAs -

A large scale expansion of Marine Protected Areas poses a significant new regulatory threat to the WRLF in the near future. MPAs are a current fad in marine resource management. Where fisheries are overexploited some form of restriction is desirable. MPAs are but one of a range of measures that may be employed. Their pros and cons compared to closed seasons, catch limits, limited licensing or other restrictions has not been properly assessed. To date they have not proved to be an important management tool in any of the world's well managed fisheries.

As one might expect, there is evidence that in heavily exploited regions there are more and bigger fish in protected areas and some of the protected population will spill over into the immediately adjacent area. However, this spillover effect has only been noted over a distance of a few hundred meters. In this respect, numerous small reserves might be more effective than fewer large ones although this is contrary to the currently popular claim that MPAs need to be much larger.

One would also reasonably expect that increased populations and spillover effects would be proportional to fishing pressure. Where only light pressure exists not much effect should be expected and this is indeed what has been found with most closed reefs on the Great Barrier Reef. This is unsurprising as the average fishing harvest rate there (9Kg/Km²) is less than ¼ of 1% of the conservative estimate of the average sustainable limit for reef fisheries (4000Kg/Km²).

A key management question is whether the increase in catch outside a reserve is greater than what is lost by having it. Or, to put it differently, is it better to protect a portion of an area and concentrate impact on the remainder or to spread the harvest over the whole and limit it by other forms of restriction? At present there is no reason or evidence to expect this. The establishment of extensive MPAs amounts to large scale environmental meddling with no clear idea of efficacy or consequences. Ironically, this is in direct disregard of the precautionary principle so often cited as justifying such measures.

Most importantly, there is no urgent need for extensive MPA's in Australia and we can afford the time to learn more and know what we are doing instead of imposing costly and un-needed measures that may create more problems than they address.

Already MPA's constitute about 10% of Australia's entire EEZ area and 25% of total global MPA coverage. Additional planned and proposed MPAs would more than double our protected area and give us nearly 50% of the world total. However, the U.S. in distant second place, has only about 1% of it's MPAs as no take areas. We are much more holy than that. Most of ours will be strictly no take.

We also have the world's lowest fishery harvest rate at only 1/30 the global average. In other words, we have the most protection where it is needed the least and we put 2/3 of our seafood demand on heavily exploited resources elsewhere by importing it. This is unconscionable. Worse yet, we sell off non-renewable mineral resources to pay for \$1.8 billion in imports of a renewable resource we have in abundance. Then, as final assertion of idiocy, this is called "sustainable management".

Why, at a time when government is faced with exploding deficits and trying desperately to stimulate economic activity do we need to be taking on additional millions in expenditure to address a problem which does not exist and to further curtail productive activity and employment?

Modelling -

Computer modelling is another current fad in science. Models are only as reliable as our knowledge of the amount, effects and interactions of all the relevant factors they include. When many of these are unknown, elaborate computation does not turn misunderstandings and wrong estimates into reality. Models of complex dynamic phenomena such as animal populations can be very sensitive to small errors. Typically they require considerable adjustment before they produce results satisfactory to the modellers. Such results may then be expected to represent more of the expectations and desires of the modellers than of anything in the real world.

Models can be made to produce any desired results and they afford an aura of high tech sophistication. They can fill endless hours in a comfortable office with much the same appeal as computer games. In contrast, real world fisheries data often demands hard work and long uncomfortable periods at sea.

Model results are now widely used as a basis for fisheries management. Generally they are not accessible to independent examination. The prestige of science is compounded by computer power and results declared for acceptance entirely on faith. Combined with the precautionary principle wherein possibility alone is deemed sufficient for action, models can be used to justify any desired decision.

The use of modelling and forecasting has become a distinct discipline in itself with well developed principles to assure reliability and transparency with regard to methods and uncertainties. The necessity of rigorous testing and verification is especially important. However, the modelling now being widely used in resource management totally ignores these well founded principles. Inputs, assumptions and outputs are typically unverified and inaccessible to any independent examination while uncertainties are not even mentioned. Unfortunately the use of modelling and forecasting in WRLF management is no exception.

The book, *Useless Arithmetic: Why Environmental Scientists Can't Predict the Future* by Pilkey and Pilkey-Jarvis (2006) examines the limitations of such modelling and provides abundant evidence of the abysmal track record of failure in environmental modelling including fisheries management.

Social Assessment -

Huddleston (2006) in *A Social Assessment of Coastal Communities Hosting the Western Rock Lobster Fishing Fleet* documents the economic decline in the industry over recent years and devotes special attention to the resiliency of the fishing communities to adjust to this change. While various elements of such resiliency (or lack of it) are examined, what is arguably the most important factor of all is never mentioned. That is, the resiliency of the industry itself which has been seriously constrained by the costs, demands and restrictions imposed by management. Although no one would argue that no regulation at all is desirable, it almost appears that management has never seen a restriction it deems unneeded and new ones do not replace old ones so much as they are added to them.

Economic Crunch -

The WRLF now faces a cost/credit/labour/demand crunch. Unfortunately management imposed restrictions have forced high costs and debt levels on many fishermen through having to lease or buy pot licences. Then ongoing further increases in costs, demands and restrictions have devalued their investment and now pose a severe obstacle to any re-structuring. As stated in the Western Rock Lobster Council report entitled Improving the Economic Efficiency of the Western Rock Lobster Fishery- Using the Input Control System: *“If the industry wishes to maintain or improve its current rate of return, we need to find a management package to allow us to re-structure input costs...”*

It is indeed crunch time for the industry and past time for serious reform of management to begin to reflect the economic reality of the fishery before it is mis-managed into economic collapse.

Conclusions

It is apparent that fisheries management has become more driven by eco-salvationist ideology and bureaucratic agendas than by sound science and efficient utilisation of resources. This is not a problem unique to WA. It has been recognized elsewhere as a growing problem and one of the world's leading fishery biologists has aptly described it as Faith-based management (Hilborn, 2006).

Sustainability is the endlessly repeated mantra of our fisheries management. Unfortunately, it refers only to the fish, never to the fishermen. This then becomes a no-brainer and no brains management is what we are getting. All that is required is to restrict the fishermen whenever possible.

Ecology is above all holistic. Every organism must have impacts in order to exist. We are no exception. Aiming to maximize our benefits and minimize our detriments requires trade-offs and balances whereby we seek to spread our impacts across our whole resource base within the bounds of sustainability. Every resource we lock up puts more pressure on others and makes balance more difficult. An unnecessary restriction in one place becomes an increased impact somewhere else.

In the current and foreseeable global economic climate we can no longer afford the luxury of ever increasing management costs wherein the only result is diminishing production and profitability.

Only the private productive sector can produce the permanent jobs, products and profits necessary for economic recovery. To do so it is going to have to have a much stronger role in regulatory decision making and the bureaucracy is going to have to be made accountable for productive outcomes.

The electorate is increasingly feeling the pressure of job losses and steeply rising food prices. They are also becoming aware of the threat they personally face from the burden of over-regulation and bloated government. Times of great risk are also times of great opportunity. Real reform becomes possible. This is such a time. With government clueless and floundering, producers have a chance to be heard.

Fisheries management entails decisions about both the condition of the resource and the operation of the fishery. While current management may arguably be qualified to make the

former assessment they are demonstrably unqualified to decide the latter. Strong industry representation in management decision making is a critical need.

Budgets and remuneration for management should be indexed to performance including production and profitability outcomes. At minimum, management budgets should be limited to a decided upon percentage of production. The current approach of spending increasing amounts for management resulting in ever decreasing production and profitability is a travesty of the whole concept of management.

Management must also be made open and transparent. This is the Internet Age. Data, models, rationales and other information that are the basis for decisions should be open to public access via the net. The current process of issuing dictates based on unverifiable claims, undisclosed models, unknown methods and inaccessible data amounts to faith based management.

The marine communities upon which fisheries are based are not fragile and delicate, They are robust and flexible. They readily recover from frequent natural perturbations. There is little risk in monitoring fisheries performance and addressing problems if and when they become apparent, rather than trying to take elaborate pre-emptive action to avoid an endless array of imaginary possibilities. In view of our ignorance and the complexity of the matters involved, it would also be prudent to test measures before applying them on a broad scale and to carefully assess their results when implemented.

In general, a much more empirically based approach is needed. Management decisions should be based on what is actually happening in a fishery, not theories and models. Regulation should be imposed only where a demonstrated need exists and results should be monitored and evaluated. Much stronger involvement of the industry in formulating management measures is essential to insure that the form of demands is appropriate to the needs and realities of the fishery. Management by theory without broad and ongoing assessment of actual conditions and results is a recipe for ongoing decline.

Such reforms are eminently practical, in accord with fundamental democratic rights and good management practice. The only real requirement for their implementation is the will to do so.

The era of cheap abundant resources is also drawing to a close. Immediately beyond the current financial recession lurks a second blow from a resumption of steep energy price increases. The world faces tough ongoing economic circumstances. No nation is better situated than Australia to weather these conditions but doing so will entail making full use of our natural advantages.

The long time Prime Minister of Singapore Lee Kwan Yew once infamously warned that, through mismanagement, Australia was in danger of becoming a white trash backwater of an Asian super economy. Sanctimoniously sitting on vast stores of badly need resources while mouthing platitudes about biodiversity, sustainability and our precious fragile environment, won't cut it. If we don't make use of our resources, hungry others will. Having to scrape aside a bit of green scum to get at them won't be much of a deterrent.

It is past time for the electorate to realise that we are all paying the price of gross resource mismanagement in our cost of living, our health, our freedom and in the broader well being of the nation.

Closing note:

At the time of this writing (23/5/09) Chinese steel industry negotiators are taking a hard line on iron ore prices and have announced they will not be bound by any deadline for agreement. They wish a return to the 2007 price. This would have wide impact across the WA economy. Planned expansions in the ore industry would likely have to be deferred as well. State government revenue would suffer a large fall. In view of their own economic difficulties, considerations for future negotiations and awareness of ore industry profitability even at 2007 prices, the Chinese seem unlikely to make major concessions. This is not a good time for further ill-founded restrictions on other industries. It will however be a good, perhaps even necessary, time to downsize a bloated bureaucracy and start to reduce unneeded regulatory restraints on the productive sector. For a government trying desperately to both cut the budget and stimulate a faltering economy we can suggest a good place to start.

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