



FEIKE

natural resource management advisors

# FEIKE NEWS

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fisheries  
aquaculture  
ecosystems

## In this Month's edition:

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## Editorial

Welcome to the March edition of **Feike News** for 2008! **Feike News** is committed to bringing you analyses and the latest developments in wild fisheries & aquaculture management in Southern Africa and globally.

MCM's decline continues, seemingly unabated as the paragraphs below indicate. Not all news about MCM can forever be bad and this bulletin reports on the positive developments where they are apparent. At present there is no shortage of failures however, and Feike News feels obliged to inform its readers accordingly.

### **MCM in Court for transgressing its own West Coast Rock Lobster catch limit.**

The West Coast Rock Lobster Association has taken MCM to court over the 1 241 'interim relief measure' rights MCM has, under pressure, allowed Masifundise and Coastal Links to allocate to small-scale lobster fishermen and women who lost out in the 2005/6 long-term rights allocation. The association, quite correctly, points out in their submission to the court that

MCM acted illegally by in fact increasing the West Coast Rock Lobster TAC arbitrarily and in so doing having no regard to their obligations to raise such intentions with the west coast lobster Working Group and beyond that MCM broke the sacrosanct rule: that of increasing the amount scientists have set as the maximum that should be harvested in one season, an amount that had been fully, and legally, allocated in the 2005/06 long term rights allocation.

Without pre-empting the court's judgment, it seems MCM is to get another hiding – one it could easily have avoided.

Why does MCM not know or understand its own laws and regulations? How come they are found to be in conflict with the different fishing sectors in this period when long-term rights enter their third year and evidence of co-management should have become evident?

Feike observes these events in utter amazement. Apropos the interim relief measures: In 2005 a different option was on the table, one that the Minister preferred at the time but which Dr. Mayekiso and his team opposed vehemently.

Indeed, the allocation of long term rights in the west coast lobster sector left out a large array of small-scale operators.

This could have been avoided at the time but the lack of engagement and real commitment by the Ministers Delegated Authority produced a skewed result, the outcome of which forced MCM to re-visit its decisions.

Whatever the merits of the decisions taken in 2005/6, a proposal to overcome the problem created was to squarely face the resultant reality that emerged. Those who did not get a right, legitimately went and got recreational licenses from the Post Office and thus went out to catch fish within the parameters of such a license: Bossies of 10 fish per day, or 4 lobster per weekend day. This practice is not new and had been the choice of necessity for many poor people over previous decades and ever since regulation of lobster catching had to be introduced.

The objectionable and socially unacceptable side effect of this perfectly legal option poor people exercise is that they are not allowed to sell what they catch. The law only thought about Gauteng tourists and aims to stop such people from subsidizing their recreational sport by selling part of their catch. What should have happened is for MCM and the Minister to recognise the anomaly they found themselves in and with the stroke of a pen do only one simple thing: Allow those who now operated on recreational permits to be allowed to sell their catches; obviously within the strict limits set by MCM in terms of recreational catches. In order not to confuse the Gauteng tourist with an indigent fisherman/woman, MCM should have requested those who want to qualify under the 'selling' exemption to prove to MCM that they: 1) depend on it for a living, 2) go out to do the catching themselves and 3) have a history of making a living from the sea. To assert these criteria could have involved community participation.

The sound management of fish stocks has everything to do with social and economic issues. Failure to recognise this always leads to conflict and then to unsustainable, secret and poaching habits. MCM has a long history of posing as a blunt instrument that only knows about fishery science imperatives without any grasp of the social conditions our developmental country faces. In the process they reap defiance, illegality and an outcome that undermines the very sustainability they so cherish.

MCM could have avoided the bruising court case they now face. MCM could have shown far greater empathy for indigent fishers who have a legitimate claim for a better deal. And MCM could have done all this without tampering with the TAC they set for west coast rock lobster.

#### **Linefish VMS Defiance by the quota holders**

The compulsory use of VMS (Vessel Monitoring System) on smaller vessels was controversial from when it was first mooted. Now the linefish associations have thrown down the gauntlet and told MCM that they will shut down the VMS's on their vessels for as long as MCM allows a number of vessels in the sector to operate without VMS.

There are several implications that can be drawn from this dramatic statement by the linefish sector. Most obvious is of course that this suggests yet another instance of a breakdown in relations between MCM and a sector in the fishing industry. Why does it have to come to an announcement of such defiant action? Did representation and communication reach such a low point that MCM can only be reached through the media and by defying the law?

The introduction of VMS was always controversial given its cost to the individual vessel owner, especially when the return of marginal catches for many in this sector is taken into account. Cheaper technology, through the employment of cell phones in the tracking of vessels has apparently not yet become a viable option, but would potentially drastically reduce costs.

At the same time MCM feels obliged to monitor more closely the smaller vessels, given their rapid deployment by truck and trailer from any number of monitored and un-monitored slipways. The speed with which these vessels can duck in and out of Marine Protected Areas and given the parlous state of many of the species accessible to the linefish sector, make the MCM case a compelling one.

But if MCM is inconsistent in its application of the rules resulting in defiant action as is now threatened, its relations with this fishing sector hardly seem healthy. These events happen at a time when MCM's compliance capacity has been questioned in many quarters. Dr. Mayekiso, the acting head of Monitoring, Compliance and Surveillance has to repair these bridges if he is to ever take a first tentative step towards joint management. Linefish is a sector in which relations between the authority and those who exploit it needs to be co-operative and not confrontational.

### **New DG for DEAT?**

Minister van Schalkwyk has advertised the post of Director General of DEAT to replace Pam Yako who surprisingly has been appointed DG at Water Affairs. Is this the result of the breakdown in relations between her and Minister van Schalkwyk? There are high expectations in the fishing industry for the Minister to appoint someone with a better grasp of the needs in the fishing sector.

### **Harbour Plans**

MCM and PWD have demonstrated beyond any doubt that economic development and the creation of jobs is not something they subscribe to for South Africa. Fishing companies, tourist ventures and restaurants have queued up to have their building plans within the 12 designated fishing harbours approved. The queue is growing steadily longer because the two Government Departments responsible have ceased to do anything – in fact stopped working over two years ago.

Aquaculture extension plans, restaurant alterations, club facilities, tourist outlets have all been stymied. To add insult, it is next to impossible to get any information from any officials. The one excuse was that a study had been commissioned to look into the long-term plans for harbours. This sounds reasonable enough since the harbours were conceived as fishing harbours but today meet recreational, tourist and real estate needs. But the said study was concluded last year and nothing further has been said or happened. If truth were told, there is an irrational turf war between MCM and PWD over who will get the spoils from the potential of increased economic activity in these harbours. Both dream of vast incomes they may attract at a point in the future and neither have the skills to resolve the jurisdictional issue over whose turf it is or should be.

It is abundantly clear that the bureaucrats in Government are not likely to make a success of the economic potential hidden in these harbours, whoever ultimately defeats the other. The only option is to create a private sector entity that has contractual obligations to the state, such as ensuring that fishing interests are not shunted aside.

Sadly the Minister and the Portfolio Committee stand idly by and do nothing either. When they wake up we will

probably find that the 12 harbours will be transformed into extensive building sites, just when the 2010 world Cup tourism hits South Africa.

Batho Pele has once again been buried deep. No communication or explanation is afforded those whose applications lie and wait. The President, in his speech spoke about delays of this kind being unacceptable, but this clearly does not worry the hierarchy at MCM and PWD.

### **Small-scale and Subsistence Policy Forgotten?**

More than a year ago MCM issued draft policy concerning small-scale and subsistence fisheries. All has gone quiet. Confusingly the Interim Relief Measures have been introduced in the West Coast Rock Lobster sector impacting on this policy, but this has led to litigation – see above.

### **Coastal Management Bill**

The Portfolio Committee on Environmental Affairs and Tourism needs a kicking off. The long overdue Public Hearing on the National Environmental Management: Integrated Coastal Management Bill (B40 – 2007), called hearings, then cancelled them and finally called for such a hearing on a Thursday for the meeting to be held the next Tuesday. Hardly fair notice! Bully to the DG of Home Affairs who complained precisely about this type of shoddy conduct of Parliamentarians.

The hearing was poorly attended if one considers the many different users who will be affected by the Bill. Instead the Victoria and Alfred Waterfront was well represented – and virtually no one else.

Will this Bill ever see the light of day? It failed to make the Legislative agenda by a whisker prior to the 2004 elections. The Bill has lollled around for so long that countless property developers have seen what was coming and have compromised the coastline with their developments. The Bill speaks of the coastline being the property of all South Africans, but given the passage of time countless little pockets of elite dwellers have occupied places and secured exceptions for themselves. The Bill is not retrospective. Thank you DEAT/MCM and Portfolio Committee for giving all these property sharks so much warning. Why is there this seeming lack of appetite to get this Bill passed?

### **Boat Based Whale Watching**

In response to queries by an individual in the whale watching industry as to when the whale watching policies will be completed, MCM responded by saying that “As soon as the policies are approved, all applicants will be sent the application forms to complete. Thereafter, the applicants will go through a check system checking on criteria and then the permits will be issued.” In short, they will send applications to existing right holders. Feike hopes the author of the letter was just temporarily confused.

In the meantime it is rumoured that MCM is conducting disciplinary proceedings against Herman Oosthuizen, South Africa's delegate to the International Whaling Association and also responsible for Boat based Whale Watching and Shark Cage Diving at MCM.

### **Filming in an MPA**

And:

You've got to hand it to MCM, their logic is impeccable! In response to a question they recently wrote to someone who needs to get into a Marine Reserve in order to film seals from a vessel. MCM advised: "You are correct that you can dive through [the MPA] providing there is no diving equipment (as per gazette) on board at all." 'Dive' was later corrected with 'drive through'. Ze law is ze law and we apply it bluntly even if it seems utterly stupid.

### **And here is the good news**

The alleged abalone poachers, who were set free by a court in January because the prosecution had failed to make a coherent presentation to the judge, have now been re-charged. The case involves 2.5 tons of confiscated abalone. Several Chinese nationals are amongst the accused.

And on Thursday, 20<sup>th</sup> March MCM won its case against the 103 former abalone rights holders who challenged the validity of the Minister's decision to effectively shut down the harvesting of abalone in the wild by declaring a zero TAC in the remaining catch zones.

The court's decision is welcome but the fault lies elsewhere. Once again this is a demonstration of MCM's breakdown in relations with this sector of fishermen. Things might have looked different if MCM had engaged these fishermen on the draft MCM policy on re-seeding in designated zones depleted species. – Instead they now have another group of people hardened in their opposition to the authority.

A break-through in lobster poaching. It has long been rumoured that lobster are poached off Cape Point. The arrest of several poachers on a vessel filled with mostly under-sized lobster is welcome indeed!

## **1. MPA'S COVER JUST 0.65% OF OCEANS**

A project to create a global database on marine protected areas has released new figures on the state of the worlds MPAs. Representing the most authoritative figures to date, the findings show the total area covered by MPA's worldwide is less than 1%.

### **Feike Calendar 2008**

See Feike's 2008 Calendar on [www.feike.co.za](http://www.feike.co.za). An A3 colour version can be ordered at a cost of R100 (incl of SA Taxes, but excluding postage) by emailing [sunday@feike.co.za](mailto:sunday@feike.co.za).

### SeaArc Sinks

After much fanfare about thousands of jobs that would result from an American investment in a Koega based shrimp farm, the suspected mirage has seemingly dissolved before it even started. Punted by the Watson family of Port Elizabeth SeaArk was to be the first really massive break-through for aquaculture in South Africa. Without an approved EIA, the introduction of an exotic species and now the multiple financial scandals around some of the investors suggest this project is dead before it ever started.

The figures come from the MPA Global database (<http://mpaglobal.org>). MPA Global is collaboration of UNEP-World Conservation Monitoring Centre, IUCN World Commission on Protected Areas-Marine, World Wildlife Fund, and the *Sea Around Us* Project at UBC's Fisheries Centre. The MPA Global database originated from the World Database on Protected Areas, and is in the process of being re-incorporated in the latter (MPA News 9:7).

The criterion for inclusion in MPA Global is the IUCN definition of MPA: "an area of intertidal or sub tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment" (IUCN 1992). To date there remains debate over whether some types of spatial management measures, such as permanent fisheries closures, should be included in the database. MPA Global does not include such areas.

According to MPA Global, there are 4 435 MPA's designated worldwide and the area covered by these MPA's is 2.35 million km<sup>2</sup> covering just 0.65% of the world's oceans. The percentage of area within EEZ's covered by MPA's is 1.6%. The worlds ten largest MPA's are;

1. Phoenix Islands Protected Area (country: Kiribati) — 410,500 km<sup>2</sup>
2. Papahānaumokuākea Marine National Monument (U.S.) — 362,000 km<sup>2</sup>
3. Great Barrier Reef Marine Park (Australia) — 344,400 km<sup>2</sup>
4. Macquarie Island Marine Park (Australia) — 162,000 km<sup>2</sup>
5. Galápagos Marine Reserve (Ecuador) — 133,000 km<sup>2</sup>
6. Greenland National Park (Denmark) — 110,000 km<sup>2</sup>, excluding terrestrial area
7. Seaflower Marine Protected Area (Colombia) — 65,000 km<sup>2</sup>
8. Heard Island and McDonald Islands Marine Reserve (Australia) — 64,600 km<sup>2</sup>
9. Komandorsky Zapovednik (Russia) — 55,800 km<sup>2</sup>, including buffer zone
10. Wrangel Island Zapovednik (Russia) — 46,700 km<sup>2</sup>, including buffer zone
11. All South Africa's MPA's, including buffer zones – 4,560 km<sup>2</sup>

The Pacific Island nation of Kiribati's recently declared world's largest marine reserve brims with reefs, fish and birds. The Phoenix Islands Protected Area, which lies near the equator about half way between Fiji and Hawaii, covers 410, 500 km<sup>2</sup>, and is one of the planets last intact coral archipelagos and is threatened by over-fishing and climate change.

Studies led by the New England Aquarium have found more than 120 species of coral and 520 species of fish, some new to science. The area also is also home to some of the most important sea bird nesting sites in the Pacific. It also boasts large populations of fish and sea turtles, the aquarium and Conservation International said.

The protected zone is more than double the area Kiribati originally pledged to protect at a UN biodiversity conference in Brazil in 2006. "The new boundary includes extensive seamount and deep-sea habitat, tuna spawning grounds and as yet un-surveyed submerged reef systems," said Greg Stone, the aquarium's vice-president of global marine programmes.

In comparison, according to figures on the MPA Global website, South Africa only has 4 560 km<sup>2</sup> of its waters protected under MPA's out of an EEZ of approximately 1,3 million km<sup>2</sup> (including islands). In light of these figures, one must ask, what

happened to the Prince Edward Islands MPA? Whatever happened to South Africa's lead and its promises at the World Summit on Sustainable Development in 2002?

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## 2. THE ELENTH PLAGUE?

Scientists in Spain are warning that the plagues of jellyfish that have been the scourge of Mediterranean swimmers in recent years will return this summer. In November, scientists at the Barcelona-based Institute of Marine Sciences (ICM) began studying the life cycles of jellyfish off the Costa Brava, and were alarmed to detect large numbers of the *Pelagia noctiluca*, commonly known as the "mauve stinger", growing in the winter, ready for an assault on Spain's beaches.

The study revealed that jellyfish proliferate throughout the year, not just in the summer. Between November and January, scientists discovered 30 colonies, or blooms, ranging in size from four to 10 jellyfish per cubic metre of water, all along the Catalan coast.

#### Whale Watching Update

In response to queries by an individual in the whale watching industry as to when the whale watching policies will be completed, MCM responded by saying that "As soon as the policies are approved, all applicants will be sent the application form to complete. Thereafter, the applicants will go through a check system checking on criteria and then the permits will be issued." In short, they will send applications to applicants. The description of the intended process sounds rather questionable.

According to Josep-María Gili, research professor at the ICM, these groups were born last autumn, and the summer tides will carry them inland from deeper waters, causing the plagues that have seen millions of jellyfish wash up on Spain's beaches in recent years. "The problem seen on the beaches is not the main concern for scientists," said Professor Gili, "For us the major worry is the global disequilibrium in the sea caused by over-fishing."

As a result of over-fishing, the jellyfish do not have to face their usual predators and competitors, which usually regulate population growth. Numbers of large fish such as swordfish and red tuna, which eat jellyfish, have been drastically reduced by bad fishing practices, as have the smaller fish, such as sardines and whitebait, which compete for food with the stingers. Global warming has also brought about the ideal conditions for jellyfish to breed: mild temperatures, little rain and a lack of the usual winter rainstorms. Plagues of jellyfish are nothing new -- they often recur in cycles of up to 10 years, but recently, these cycles have become ever shorter, and the blooms more widespread and populous.

According to Gili, the recent growth in jellyfish numbers "is a message from the sea that something is wrong. People need to realise that fish, especially adult fish, play an important role in the sea -- they are the principal carnivores. We must change the laws about over-fishing and the type of fishing." The problem is not restricted to the Mediterranean. "Spectacular growth has been found in jellyfish populations in Japan, Namibia, Alaska, Venezuela, Peru, Australia, this is an international ecological problem," Gili said.

Last summer, scientists, fishermen and swimmers were asked to alert the authorities whenever they saw a bloom, as part of an early warning system in Spain known as Operation Jellyfish. But the operation finished at the end of the summer, and Gili described it as a "sticking plaster" approach.

"It needs to be accompanied by serious scientific study and a continuous campaign to raise awareness throughout the year," he said. Maritime scientists are calling for a more unified approach this year. They want government funding for rapid-reaction boats to patrol the Spanish shoreline, ready to gather up the jellyfish wherever they appear.

Dr Reyes Tirado, at the Greenpeace research laboratories in Exeter, said the plagues were not just caused by over-fishing: "Our activities on land also play a big part ... overloading of coastal waters with nutrients both from sewage and from agricultural fertiliser runoff are also important," she said. "Excess nutrients

#### Feike Wins IUU Photo Award

The Stop Illegal Fishing website ran a photo competition and Feike is delighted that its very own Shaheen Moolla was the winner of the first Stop Illegal Photo for January. Shaheen submitted photos of the fishing vessel ROSS, a very well known IUU Patagonian toothfish vessel that has changed its registration more than five times to evade the law in different countries, and has been successfully held in Maputo port for over six months.

### **BEE and Capital Gains TAX**

A Feike News reader adds important additional comment on the article in our previous edition on tax concessions: "When taking in BEE partners we used people who are actively involved on our vessels. Being PDI's these people did not have the funds to purchase shares in our companies, so as a result we had to structure our deals to make it possible for them to pay us back over time. The major problem is that the moment we transferred the shares we became liable for Capital Gains Tax, even though we would only receive payment at a later stage. As we built our companies up over a vast period of time, the CGT was in some cases a large amount of money."

Mr. Manuel, are you listening?

### **Slowing of Ocean Currents**

A slowing of ocean currents as a result of climate change may over the next 100 years interrupt the transport of nutrients to the most valuable coastal fishing zones, and the flushing away of pollution.

can have disastrous effects on estuaries and coasts, causing blooms of harmful algae and helping jellyfish populations to increase.

"Add to these factors the warmer waters and changing marine currents caused by climate change and the problem of jellyfish invasions seems set to get much worse in the future." One cause of the problem is the decrease in leatherback turtles, a principal predator, which have been driven to the point of extinction because the beaches where they lay eggs have been used for tourism. Originally published in the Guardian Newspapers Limited 2008

### **3. FISHERIES FACE COLLAPSE IN DECADES**

Fisheries face collapse in mere decades according to a UN report. A deadly combination of climate change, over-fishing and pollution could cause the collapse of commercial fish stocks worldwide within decades according to Achim Steiner, head of the United Nations Environment Programme.

Steiner stated at a climate conference involving more than 150 nations and 100 environmental ministers that the combination of climate change, overfishing and pollution is "putting a death nail in the coffin of world fisheries"

More than 2.6 billion people worldwide depend on fish for protein states a UNEP report titled "In Dead Water". Climate change has compounded previous problems such as over-fishing, as rising temperatures kill coral reefs, threaten tuna spawning grounds, and shift ocean currents and with the plankton and small fish that underpin ocean food chains.

"The question is not whether to stop fishing, but to address climate change, which is creating a degree of impact we've not seen before" said lead author of the UNED report, Christian Nellemann. "We are getting more and more alarming signals of dramatic changes in the oceans. The recovery from the changes we're making will probably take a million years"

The report covers the following issues;

- Half the worlds catch is caught in less than 10% of the ocean
- With climate change, more than 80% of the world's coral reefs may die within decades
- Ocean acidification will also severely damage cold-water coral reefs and affect negatively other shell-forming organisms.
- Coastal development is increasingly rapidly and is projected to impact 91% of all inhabited coasts by 2050 and will contribute to more than 80% of all marine pollution

#### **Bluefin Tuna Grown in Captivity**

An Australian company says it had developed the first artificial breeding plan for the endangered southern bluefin tuna, in high demand for sashimi and sushi.

According to a 2006 report, southern bluefin tuna catches, also off the South African coast, are unsustainable with an even chance that all fish capable of laying eggs will be gone by 2030 if current catch levels continue. Clean Seas Tuna said the successful collection of captive southern bluefin tuna sperm and eggs could pave the way to year-round production of the fish.

Clean Seas, said it was optimistic it would be able to emulate the success it had achieved with other species such as the yellow-tail kingfish. Increasing concern about depleting global fish stocks has led to a buoyant outlook for aquaculture, or fish farming, as health-conscious consumers drive demand for fish.

Shares in the company rocketed as much as 30 percent following its announcement.

- Climate change may slow down the ocean thermohaline circulation and continental shelf “flushing and cleaning” mechanisms crucial to coastal waters quality and nutrient cycling and deep-water production in more than 75% of the world’s fishing grounds
- Increased development, coastal pollution and climate change impacts on ocean currents will accelerate the spreading of marine dead zones, many around or in primary fishing grounds
- Over-harvesting and bottom trawling are degrading fish habitats and threatening the entire productivity of ocean biodiversity hotspots, making them more vulnerable to climate change.
- Primary fishing grounds a likely to become increasingly infested by invasive species, many introduced from ship ballast water.
- The worst concentration of cumulative impacts of climate change with existing pressures of over-harvesting, bottom trawling, invasive species, coastal development and pollution appear to be concentrated on 10-15% of the oceans concurrent with today’s most important fishing grounds
- A lack of good marine data, lack of funding for ocean observations and an ‘out of sight – out of mind’ mentality may have led to greater environmental degradation in the sea than would have been allowed on land
- Substantial resources need to be allocated to reducing climate and non-climate pressures. Priority needs to be given to protecting substantial areas of the continental shelves. These initiatives are required to build resilience against climate change and to ensure that further collapses in fish stocks are avoided in coming decades.

The full “In Dead Water” report can be acquired from Feike’s David Arnott via e-mail at [darnott@feike.co.za](mailto:darnott@feike.co.za)

#### **4. THE FUTURE OF AQUACULTURE?**

According to a report published in the newsletter of the Aquaculture Association of Southern Africa, March 2008, new technology may bring aquaculture to new territory. Scientists are developing water recirculation technology that may bring aquaculture inland, but it needs to be cheaper for it to be applied for profit, because non US seafood farmers are undercutting prices at the market.

Research at Mote Marine Laboratory’s Centre for Aquaculture Research in Florida is making tank-based, inland fish farming cheaper, cleaner and sustainable. Mote scientists are crafting closed-circuit water recycling systems

### IWC and Our Oceans

Feike observes that the International Whaling Commission stumbles into further absurdity. The two camps, the pro and anti whalers are in a tussle to the death trying to get nations to join it hoping to secure a majority that will swing the vote in Japan's favour or not. Nations without the remotest interest or concern for the oceans, let alone whales, are enticed to join the annual ritual the IWC has performed since 1946.

What is it all about? Why can the simplest of things not be faced squarely? Japan (with Norway and Iceland in tow) is manipulating the international community to serve its interests to roam the oceans so that they can make commercial gain from whale meat. The proposition that we, the rest of the world, should afford them the chance to endanger the marine environment and lay claim to oceans thousands of kilometres from their own coast is anathema.

Whaling nations brought whale populations very close to extinction once. Now they want a further chance. They say they will be more careful this time. It seems absurd for Switzerland or Mongolia to sit and pontificate whether Japan should have this chance or not. The hour has surely come for all Southern Hemisphere nations to say to Japan: Not in our backyard! We see no reason to afford you a commercial right in our ocean spheres. Or would it seem reasonable for South Africa to demand to explore oil off the Japanese coast?

that produce negligible environmental impacts, which could be used some day as part of a fully integrated aquaculture industry, with feed producers, hatcheries, grow-out facilities and processors. They have found ways to grow the ocean's bounty on dry land, but now they have to make it turn a profit.

Marine aquaculture operations, which use open-ocean holding pens to grow fish, also have to worry about biofouling, red tide and hurricanes. Zajicek said "If you are going to decide to do aquaculture, you better have a cast-iron constitution, because the deck is stacked against fish farmers at almost every turn." So far Mote Marine's operation isn't wrapped up in profit projections, it is riding on the spiny, prehistoric back of the Siberian Sturgeon, *Acipenser baerii* and now boasts about 78 tons of sturgeon swimming in its tanks. Sturgeon produce caviar, one of the most highly prized delicacies in the world. They began experimenting with different sturgeon species in 1998 and caviar and meat are now harvested on a regular basis. The meat goes to local markets and restaurants, and the caviar is under contract with the noble Parisian Petrossian brand. Current market price for a kilogram of Mote's caviar is approximately \$4,900.

A parallel financial study of the operation is in progress, but the goal of Mote's research is not to make money. One of its key goals is to develop low-cost water-recycling technology. "What we are trying to develop is elegantly simple engineering. Where there is a lot of elegance in the actual engineering, the operation of it will be more simplified," Michaels said. "So you don't need to be a rocket scientist to run a fish farm, that's the ultimate goal."

"The whole industry cannot convert to this technology today," Main said. "We have to develop the technology and perfect it, and as we do that we drive its cost down." So far Mote has invested approximately \$25 million in the centre during the last seven years. Main said the centre's physical infrastructure is worth \$10 million, the same amount of capital she recommends prospective sturgeon farmers start out with.

"The technology is expensive, sturgeon is the only fish it makes economic sense to grow right now," Michaels said. "One of our goals is to drive the cost of this technology down, so it can be applied to more species, and so that the cattle farmer who may want to try something, but not necessarily sturgeon, has an opportunity to try growing another type of fish in an inland facility, away from all the geopolitical issues on the coast." The state expects aquaculture to evolve in coming years, possibly with this technology, but it all depends on the bottom line. "Will recirculation systems get cheap enough to produce a 70-cent fish at the gate?" Zajicek asked. "Probably not, but with something like a

The IWC is the wrong instrument to manage the dangers our oceans are increasingly being subjected to. What if Australia, New Zealand, Chile, Argentina, South Africa and others asserted that the Southern Hemisphere oceans are no longer open to those who have destroyed the marine environment in the north and thus seek fortunes further afield? Japan is reported to seek the support of Angola now. In usual fashion Japanese development aid will be used as the carrot in such solicitation.

Go home Japan, we don't need you here!

sturgeon or maybe a pompano, it could work. All these fish are challenging to raise, but if it was easy, we would be doing it already."

F E I K E