Fishing Industry’s View on the Need for Good Ecosystem Research Regarding Marine Mining Impacts.

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17 October 2012

ANNUAL SCIENCE FORUM OF THE BENGUELA CURRENT COMMISSION
Fishing industry’s perspective

- We are the old boy’s on the block in terms of utilising Namibia’s marine resources, but we say this respectfully as we are an extractive industry and know that we have a key responsibility to ensure we don’t adversely impact the Benguela Current Ecosystem.

- At Namibian Independence we inherited a heavily overfished commercial resource and since then, together with the Ministry of Fisheries and Marine Resources, have been working to rebuild this resource. It hasn’t been an easy task and still isn’t, but is well worth the effort as it provides us with a sustainable livelihood into the future.
## Total allowable catches in tonnes

Source: Ministry of Fisheries and Marine Resources

<table>
<thead>
<tr>
<th>Year</th>
<th>Pilchard</th>
<th>Hake</th>
<th>Horse Mackerel</th>
<th>Red Crab</th>
<th>Rock Lobster</th>
<th>Monk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>40,000</td>
<td>60,000</td>
<td>150,000</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>1997</td>
<td>25,000</td>
<td>120,000</td>
<td>350,000</td>
<td>2,000</td>
<td>260</td>
<td>n.a.</td>
</tr>
<tr>
<td>2005</td>
<td>25,000</td>
<td>180,000</td>
<td>350,000</td>
<td>2,300</td>
<td>420</td>
<td>11,500</td>
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<tr>
<td>2012</td>
<td>31,000</td>
<td>170,000</td>
<td>320,000</td>
<td>3,100</td>
<td>350</td>
<td>14,000</td>
</tr>
</tbody>
</table>
Namibia seafood export trade statistics – growth trend

Source: National Planning Commission Statistics Unit

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value N$ billions</td>
<td>3.140</td>
<td>4.228</td>
<td>4.581</td>
<td>4.804</td>
<td>5.076</td>
</tr>
</tbody>
</table>
## Fishing industry total direct employment

Source: Ministry Fisheries & Marine Resources

<table>
<thead>
<tr>
<th>Species sector name</th>
<th>Number of employees in 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hake</td>
<td>8956</td>
</tr>
<tr>
<td>Monk</td>
<td>350</td>
</tr>
<tr>
<td>Red Crab</td>
<td>81</td>
</tr>
<tr>
<td>Rock Lobster</td>
<td>455</td>
</tr>
<tr>
<td>Pilchards</td>
<td>1361</td>
</tr>
<tr>
<td>Horse Mackerel</td>
<td>1029</td>
</tr>
<tr>
<td>Line Fish</td>
<td>395</td>
</tr>
<tr>
<td>Large Pelagic (Tuna and Swordfish)</td>
<td>593</td>
</tr>
<tr>
<td>Seaweed</td>
<td>80</td>
</tr>
<tr>
<td>Seals</td>
<td>81</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>13380</strong></td>
</tr>
</tbody>
</table>
The wetfish hake industry

- Landing of iced wetfish hake from a trawler
- Large numbers of staff characterise onshore wetfish hake processing
The monk fish sector

- The monk fishery is likely to be the most negatively impacted of all fisheries initially, due to its sedentary nature and close proximity to proposed marine phosphate mining sites.
The midwater trawl horse mackerel sector

- A high catch volume fishery requiring effective economies of scale to ensure profitability
- Selling into the African market, promoting food security
The pilchard sector

- A small but important sector employing 1300 people for 3-4 months of the year.
The mariculture sector

- During summer months when water temperatures rise, nutrients promote algal blooms.

- Anticipated marine phosphate mining operations will inevitably cause increased dissolved nutrients, as they dissolve out from the water part of the sediments.

- We are worried this could result in harmful algal blooms becoming common.
Namibia’s Marine Resources Act wins silver at 2012 Future Policy Awards

- Awarded recently at UN Headquarters in New York for instituting an ecologically and economically viable fishing industry, our Marine Resources Act is considered one of the world’s most inspiring and innovative ocean protection policies.

- However, could the “cumulative impacts” of marine phosphate mining in Namibia put all this at risk, including the long-term viability of Namibia’s fishing industry? This is why a rigorous Strategic Environmental Assessment (SEA) study is required.
What is good ecosystem research in a mining context?

- Firstly, what are the differences in scale of impacts of say oil and gas drilling compared to marine phosphate bulk dredging?
- The Namibia rock lobster resource has never recovered since heavy overfishing pre-Independence. Following the 2008 world economic crisis, coastal marine diamond dredging was stopped in Namibia for a period and rock lobster catches from the same area improved. This raised eyebrows not only amongst fishermen, but also scientists.
- The 2011/2012 Namibia tuna fishing season has been the worst on record. Seismic events are known to put fish into avoidance mode for a few days, and marine mining seismic exploration occurred right through the tuna season.
There are no fences in the sea

- Potential marine phosphate mining companies say the size of their operations are but a speck in the ocean.
- What will the impacts be as a result of bottom sediment disruption and current flows?
- Detection of small concentrations of trace heavy metals in fish products by food safety organisations anywhere in the world could close down exports by that Namibian fishery overnight.
- Also, what are the “cumulative impacts” as more marine mining operations are given the go-ahead? One company alone currently aims to mine 5.5 million tonnes of seabed a year, with 10% returning to the sea as sediment.
The Environmental Impact Assessment Process - Mining

- In Namibia EIA’s tend to look at the “big stuff” - **what about the impacts on the foundational building blocks of the ecosystem?** It takes years and decades before these impacts show themselves – then too late to reverse damage.

- A recent marine phosphate EIA in Namibia covered:
  - Fisheries, mammals, seabirds study; Water column study; Marine benthic study; Jellyfish study
  - The terms of reference were based on “desktop research” but nowhere in the world currently undertakes marine phosphate mining so information was extrapolated from impacts of diamond dredging, fishing and fisheries research etc.
Text from the EIA studies

- **Water Column**: “…… Drawing information from other studies on ecosystem functioning and dredging. No field work was done for the project.”

- **Marine Benthic**: “As specified by the Terms of Reference, a desktop approach was adopted for the study. A macro-benthic survey was undertaken, but no further data on biotic communities or physical environment (e.g. Hydrogen sulphide (H2S) concentrations, oxygen conditions etc.) were available at the time of writing the report.

- **Jellyfish**: “Because there are so many unknowns regarding jellyfish off Namibia, any information that can be collected would be useful.”
Concerns of scientists

• Experienced international scientists working 14 years on Namibian shelf upwelling system, in partnership with local scientists (BENEFIT, BCLME, BCC)

• The stability of this system relies on finely tuned bacterial processes to maintain its sustainability, teetering always on the edge of asphyxiation or even toxification

• The planned sediment mining activities put the benthic and pelagic ecosystems at great risk, inevitably leading to the release of toxic chemicals, including the potent neurotoxin hydrogen sulphide gas and toxic metals. Namibian shelf sediments contain the highest continental shelf hydrogen sulphide concentrations ever measured, more than enough to remove all oxygen if released.
Scientist concerns cont

- If it were not for the all important sea floor sulphur bacteria, H2S would escape uninhibited, killing economically important natural resources such as lobster, demersal and pelagic fish, and jeopardising the longterm recruitment of fish by destroying their hatching habitats.

- The Namibian shelf sediment contains abundant free methane gas only one to two decimetres below the seafloor. Planned mining would inevitably lead to the release of this strong greenhouse gas, which is currently prevented by the existence of another group of bacteria that effectively remove this gas below the sea bottom.
The Namibian shelf can be seen as an inner shelf and an outer shelf. The worst conditions for hydrogen sulphide and methane are on the inner shelf (which is not targeted for mining). The conditions on the outer shelf (which is targeted for mining) are not so extreme but of course are very close to the inner shelf. So anywhere on the shelf is risky. According to the scientists, it is not the exact mining site but the whole shelf area that makes it risky. The Namibian shelf has the potential to be highly risky and each mining company cannot just pick one little spot where it maintains its little spot is “safe”.
Scientist concerns cont

- Research indicates that the bacterial processes in and on the sediment are crucial to allowing the water-column ecosystem to flourish and their removal will have, as of yet, unknown consequences.
- Bacterial activity in the sediment not only protects the environment above from the effects of anoxia and hydrogen sulphide, it even nourishes the water ecosystem with important nutrients.
- In the words of the experienced international scientists, “mining would represent a major disruption of these processes, and should at all costs be avoided”.

Fishing industry key concerns regarding marine phosphate mining

- “Good on site baseline research data is required” before mining commences, and this must cover all seasons of the year.
- Only once this is obtained will it be possible to monitor changes in the environment when mining starts.
- Proposed marine phosphate mining in Namibia is a world first, and due to the increase in scale of level of extraction, its environmental impacts are potentially far more significant than for marine diamond mining.
- With so many environmental unknowns, it is the responsibility of the mining company to properly undertake environmental research, so that when risk levels are stated, they are based on onsite research results.
- This research should meet international standards, and be open to scrutiny by internationally recognised specialist scientists.
Types of research required

- The exact concentrations of hydrogen sulphide in the sediments through fresh samples. (Frozen samples do not provide accurate results).
- Dissolved nutrient inputs from sediments need to be quantified as these can be substantial with cascading effects in the water column – must cover all seasons.
- Trace metals and other noxious compounds released into the water column must be evaluated. Elevated trace metals in the food chain will have serious implications for the marketing of fish and shellfish products.
- Sediment Plume behaviour needs to be modelled using current, sediment particle characteristics, nutrient, heavy metal and trace metal data from the site collected during different seasons through the year.
More research requirements

- Impact of changes in the Redfield Ratio as well as total nutrient concentrations in surface water due to the release of overspill water from dredging, resulting in phytoplankton blooms and changes in the food web, need measuring.

- Different marine microbes control most processes in the sediments and water column – a specialist study is required for this. Includes baseline information on Thio-bacteria which limit H2S levels in the water column.

- Fish are specific to their breeding areas, so the behaviour risks are significant if these areas are destroyed. Little information on spawning activities in the mining area is available and needs to be collected to assess recruitment. Changes in oxygen, sulphide and turbidity could have major implications for recruitment - surveys for juvenile fish covering the full annual period must be undertaken.
In conclusion

- The Namibian fishing industry is totally dependent on a healthy marine ecosystem.
- Marine phosphate mining proponents must undertake robust “on site” baseline research “before” any mining takes place, so that credible assessments can be made.
- Across the mining industry, the importance of cumulative impacts become more pervasive as the industry expands & becomes technologically more sophisticated.
Our plea

- Our plea as a fishing industry is that time is taken to “properly research” the potential environmental impacts of marine mining, in particular phosphate mining as this appears at the moment to have the greatest environmental impact, before any decision is taken to go ahead with mining. If a decision is then taken to go ahead, an Environmental Management Plan must be in place. This should define indicated mitigation needs and methods, with proper monitoring against baseline data by mining and government scientists, open to scrutiny by internationally recognised scientists.

- Otherwise our fear is that the fishing industry, which can provide ongoing benefits to the country due to it being a renewable resource, risks ever increasing losses in income and jobs as the ecosystem it relies on slowly deteriorates.
Thank you

- References: