

Possible nuclear power station impacts on near-shore marine habitats (with special reference to Thyspunt)



Prof Charles Griffiths and Dr Tammy Robinson

Marine Biology Research Centre

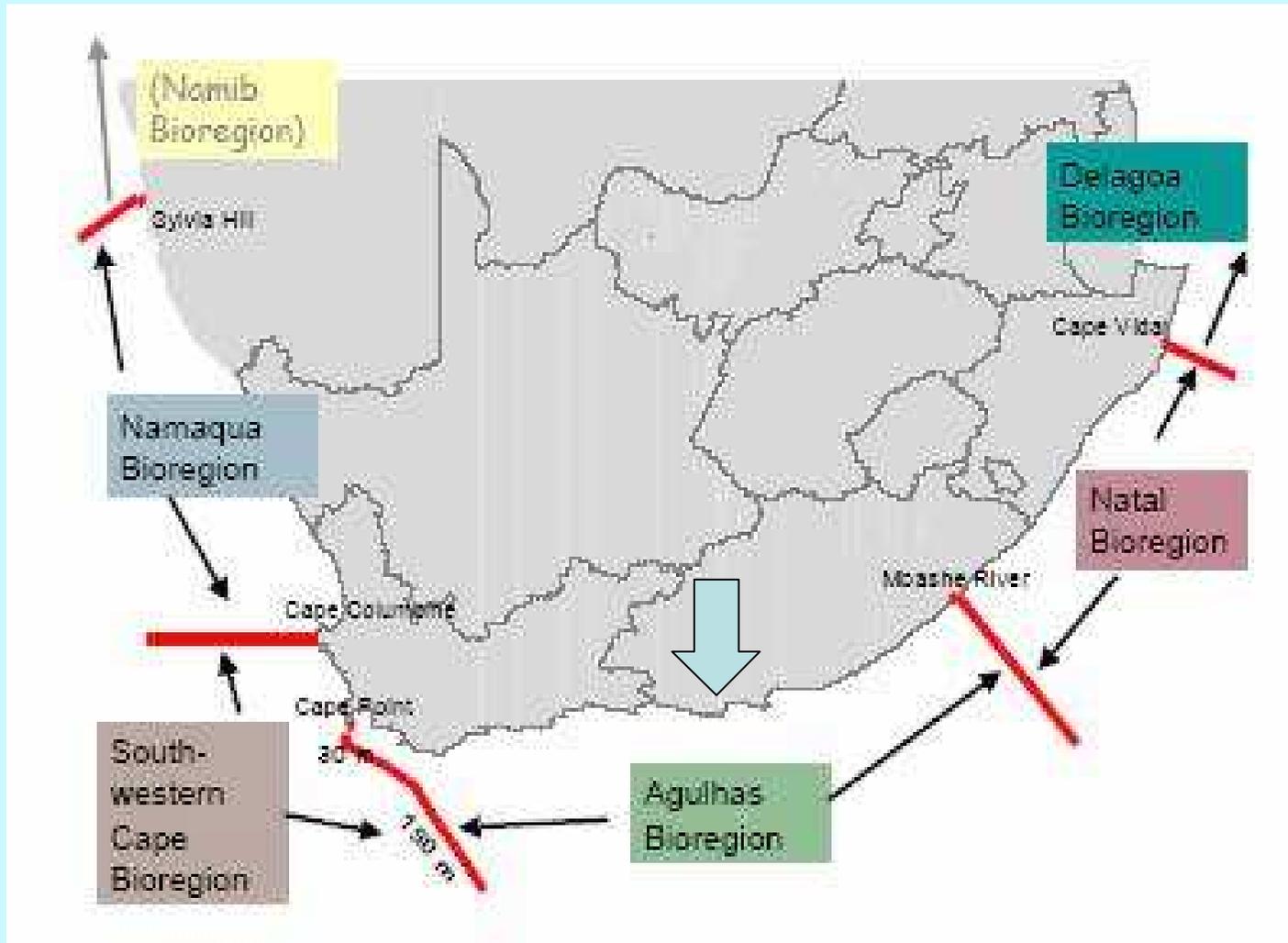
University of Cape Town

Charles.Griffiths@uct.ac.za

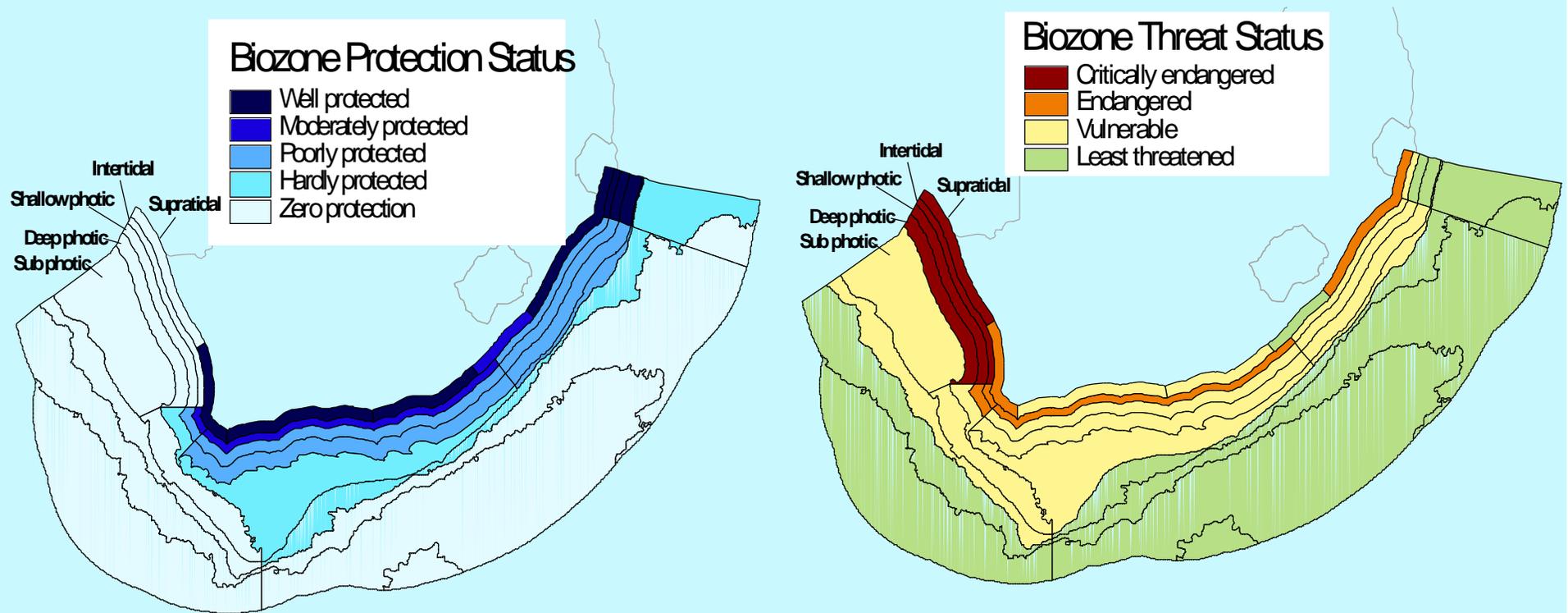
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Background:

Thyspunt lies in the centre of the large, relatively uniform Warm-temperate 'Agulhas Bioregion' of South Africa

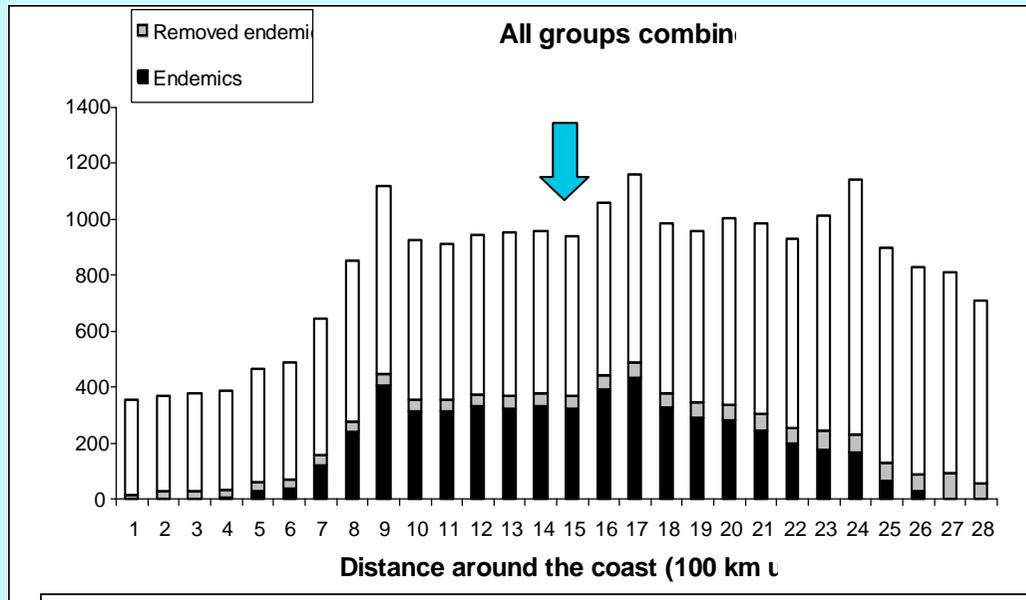


This bioregion is considered to be 'well protected' (in terms of protected areas) and is the least threatened coastal biozone in the region (in terms of exploitation pressure, mining etc)



Source: SA State of the Environment Report 2004

It lies in an area of high overall species richness and endemism (bar 15), but contains very few unique or range-restricted species (lower fig.)



Species per 100 km stretch

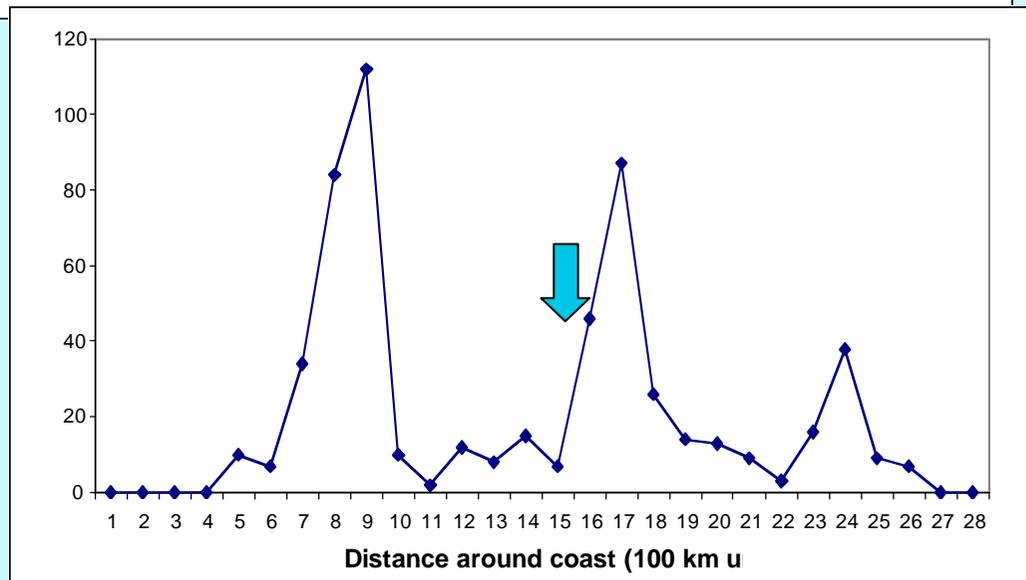
1= Orange R

8= Cape Town

15 = Thyspunt

16= Port Elizabeth

24= Durban



Range-restricted species
Per 100 km stretch
(range <300km)

Potential nuclear power-station impacts on marine environment:

1. Entrainment and death of fish and plankton in intake water
2. Death of local fauna as a result of construction work, spoil dumping, etc
3. Release of heated water and/or brine from desalination plants
4. Changes in current patterns due to breakwaters, etc
5. Creation of habitat (e.g. hard substrata where only beach existed before)
6. Access control, leading to less angling and disturbance (conservation areas)

Note: Release of radio-isotopes into the sea is not considered a threat, as cooling water never comes into contact with the reactor.

Entrainment of marine organisms in cooling water:

- Pumping, plus chlorination, of cooling water at Koeberg results in mortality of 28% phytoplankton and 43-68% of zooplankton in pumped water
- Almost no larger fish or other marine species are entrained and killed
- Wider impacts undetectable, given the much larger natural water flow through the area and the short doubling time of plankton in the cooling water

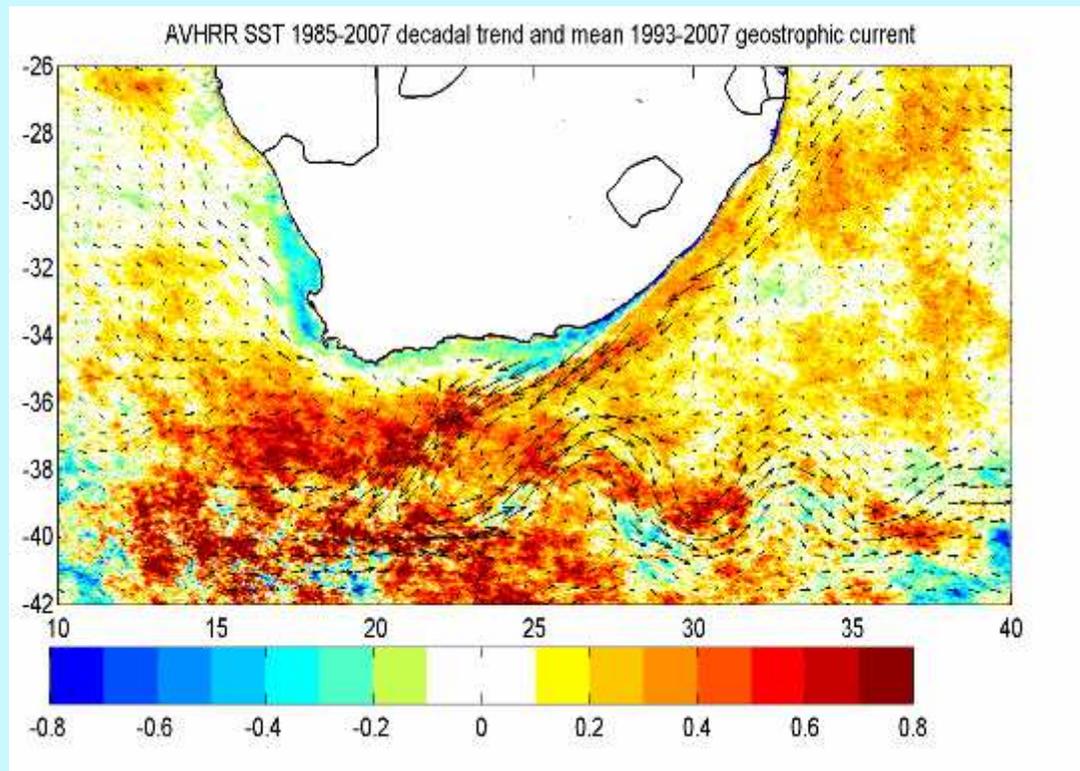
Construction and dumping:

(Regarded as the main environmental impact of concern)

- Tunneling to lay water intake pipes and laying of outfall pipes will disrupt limited areas of seabed
- Dumping of spoil can be expected to smother bottom-dwelling species over area approx 3 km² and may affect chokka squid spawning areas, but only by a few %
- This effect will be focused within the construction phase and will be localised and of limited duration (a few years)
- Recovery (spoil dispersion and colonisation) can be anticipated to take place over several years

Release of heated water:

- Volume minimal in comparison with natural flows (ca 80 m³.sec at Koeberg vs 60 million m³.sec for Agulhas Current)
- No temperature elevation >2°C detected more than 1 km from outfall at Koeberg
- Warmed plume water floats, so does not effect bottom-dwelling species
- Twice yearly surveys at Koeberg have revealed no detectable changes in biota, even within 1 km radius
- Any warming at Thyspunt is taking place in context of a long term cooling trend in region, as depicted below.



Sea temp changes
1985-2007

Release of desalination brine:

- More problematic than heating, as heavier than seawater, so sinks
- Could result in impacts during construction phase, but over limited area and limited duration of this phase
- During operational phase will be mixed with heated water, resulting in high dilution and reduced density, impact expected to be undetectable

Changes in current pattern and habitat type:

- Impacts trivial at this site, as hard substrates and complex shore topography already present and no stilling basin to be constructed
- Any additional hard substratum simply provides more habitat for attached species

Controlled access:

- Results in enhanced fish stocks and diffusion of protected fish into adjacent angling areas, but as this particular site is already restricted, little additional benefit is to be gained

Overall marine impacts - conclusions:

- Limited negative impacts expected during construction phase, mainly due to release of saline water and construction activities (excavation, dumping of spoil, etc).
- Area of impact a few km² (South Africa's EEZ = 1 million km²)
- Recovery expected to be measured in years (not decades)
- Marine impacts during operational phase expected to be undetectable, as is currently the case for Koeberg
- Positive impacts expected from conservation of site expected to continue



End

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