



5th Western Australian State

# COASTAL CONFERENCE 2009

*Whose Coast Is It?  
adapting for the future*

3C:

Climate Change:  
2.00–2.30pm  
Thursday 8th  
October 2009  
Orion Room

## Regional Models of Biodiversity for Monitoring the Impacts of Climate Change and Fishing Pressure

PRESENTER:

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### Introduction and Background

Marine communities have strong associations with environmental variables, including habitat [1, 2], temperature [3] and depth [4]. Predicted increases in ocean temperatures will result in changes in the latitudinal range and depth distribution of marine plants and animals [5, 6], as species are redistributed according to their physiological characteristics [7]. Changes in the distribution of fished species may be difficult to detect due to the concomitant effect of fishing pressure [8], however, changes in biogeographic patterns of the non-target fish community will indicate that management practices for targeted species will need to shift spatially. We present a regional model from Western Australia of how we expect the fish community to change with sea surface temperature (SST) and compare these predictions with existing monitoring data.

### Methodology

Community composition data was collected on demersal fish populations from eight regions along the coast of south-western Australia. The relationship between environmental variables and the biotic data was examined using a multivariate distance-based linear model. Evidence of a causal relationship between community structure and SST was investigated using a canonical analysis of principal coordinates, and a working regional model of community structure and SST was constructed [9]. Monitoring data indicated inter-annual variation that was consistent between locations, suggesting that the model is able to represent regional variation in community structure. However, additional temporal observations are recommended to improve the robustness of this model.

### Project Outcomes/Conclusion

This regional model can be used as a monitoring tool to assess if the community composition at particular locations is becoming more tropical, as predicted by macroecological theory and predictions of ocean

climate [6]. In comparing monitoring data with the regional model, this method uses the composition of the demersal fish sampled to in effect predict the SST regime. Any shift in biogeographic patterns will therefore provide an early warning of compositional change for ecosystem management.

## References

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