



# *Climate change and coral reef habitat: implications for fish*



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**Environment and Conservation**

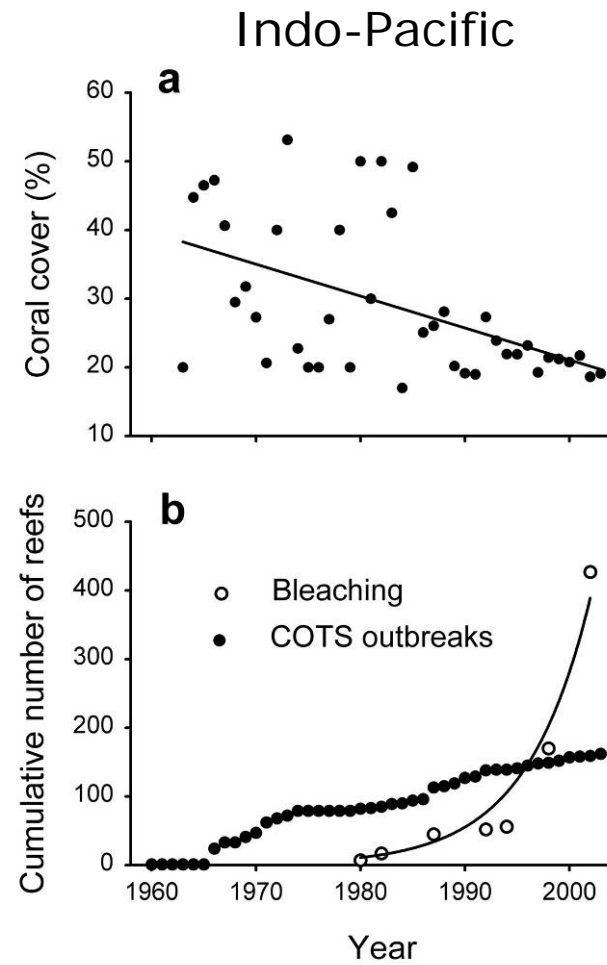
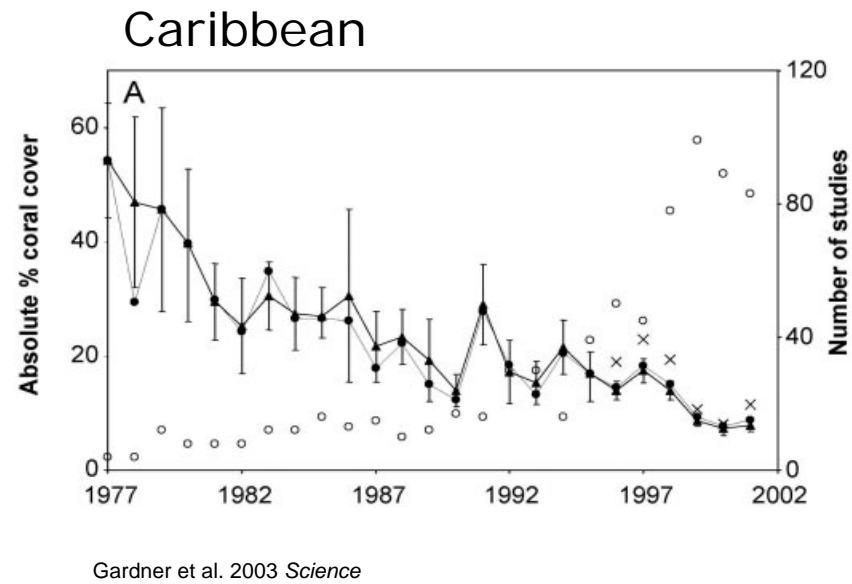
*Our environment, our future*



# Climate change and corals: The threats



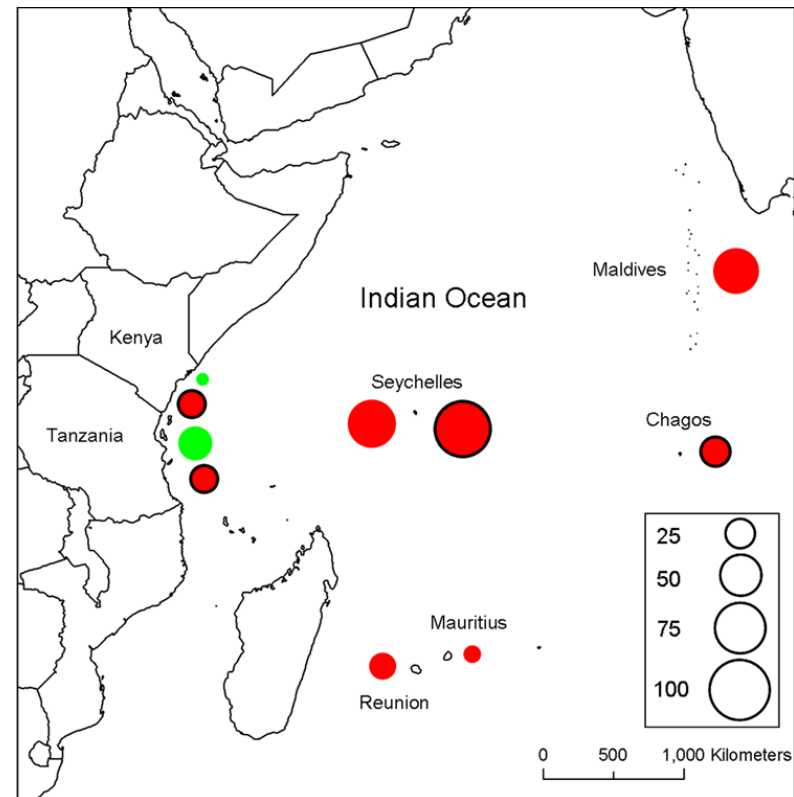
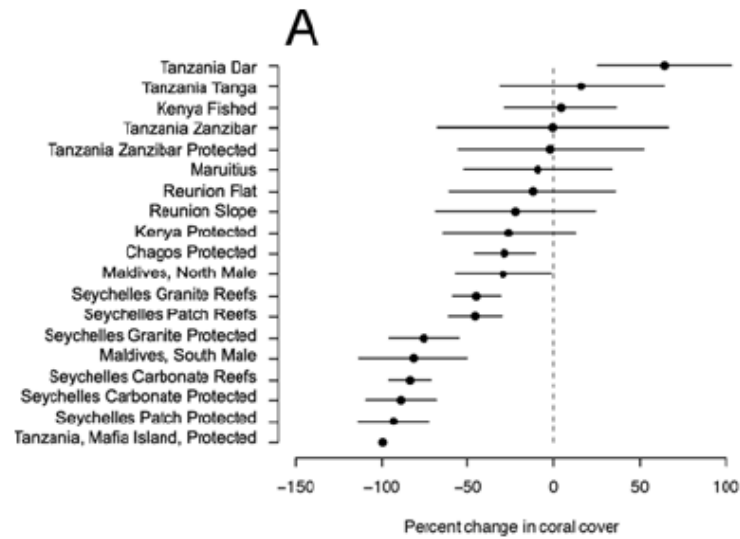
# Regional trends:



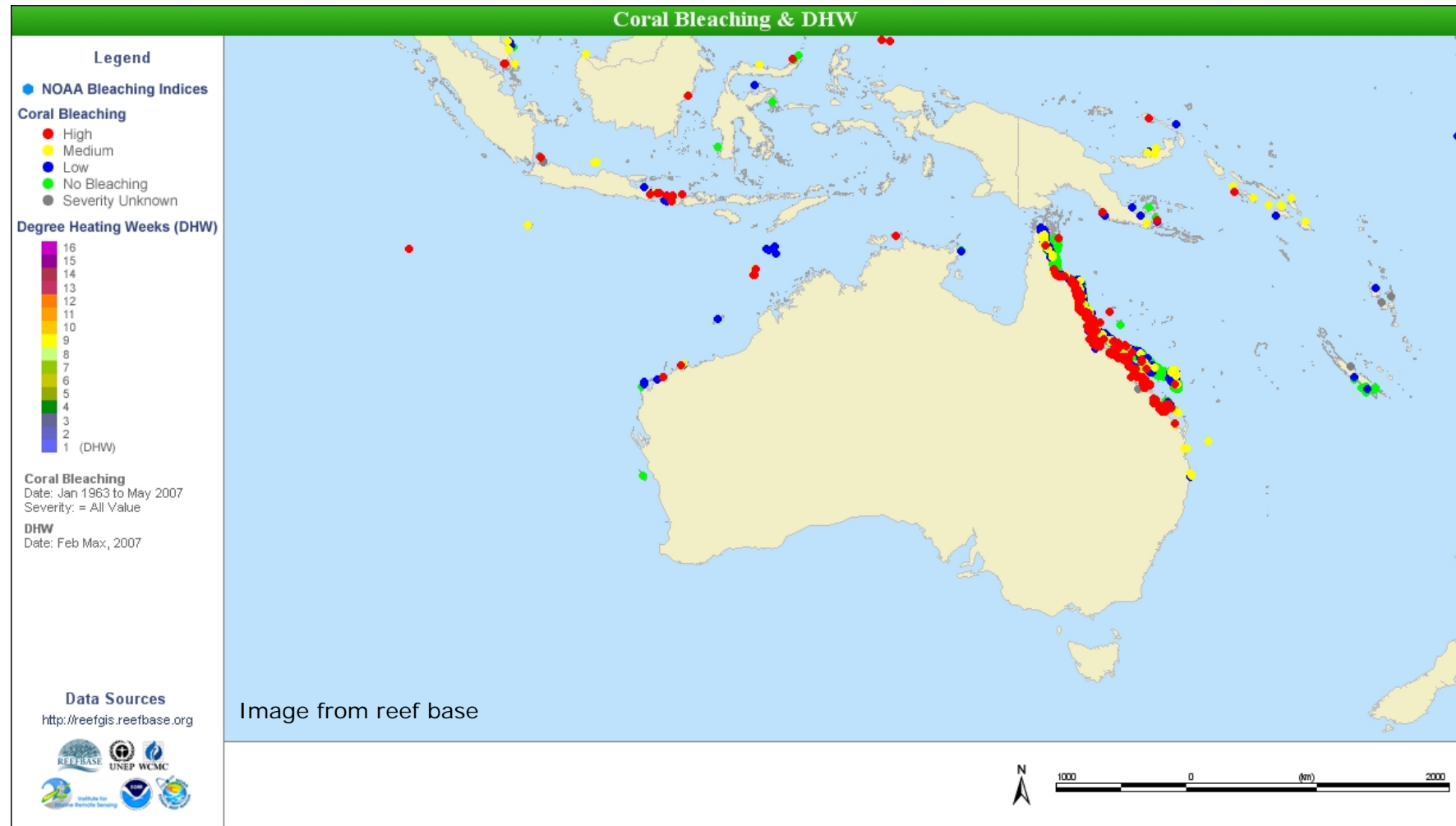
Bellwood et al. 2004 *Nature*

# Regional trends:

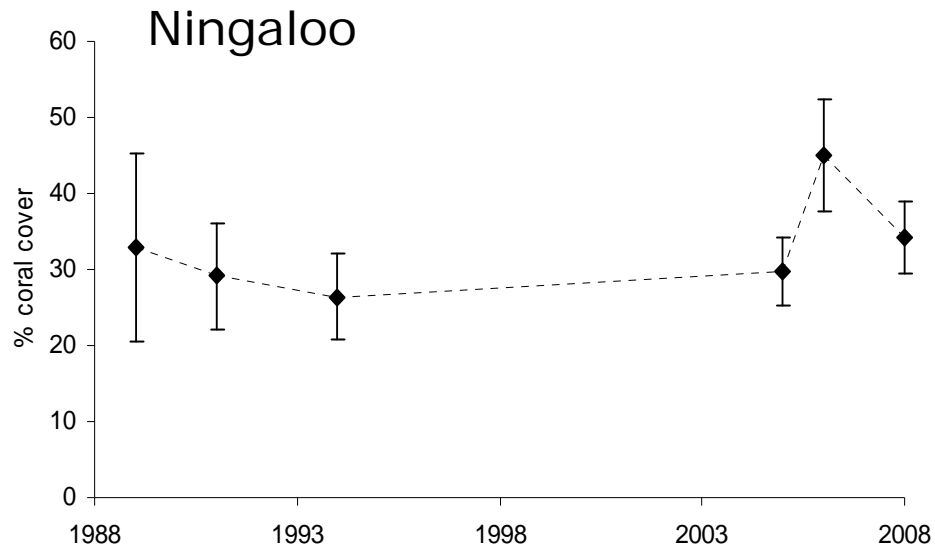
## Western Indian Ocean



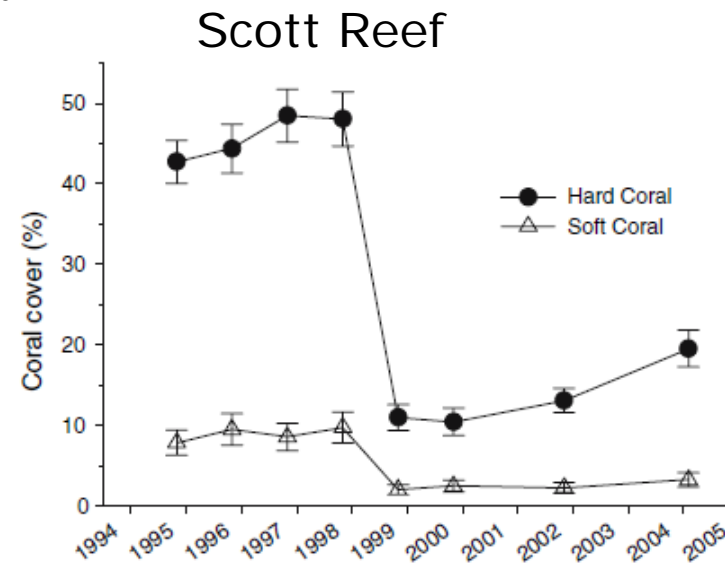
# Past bleaching events



# Temporal trends in coral cover: WA

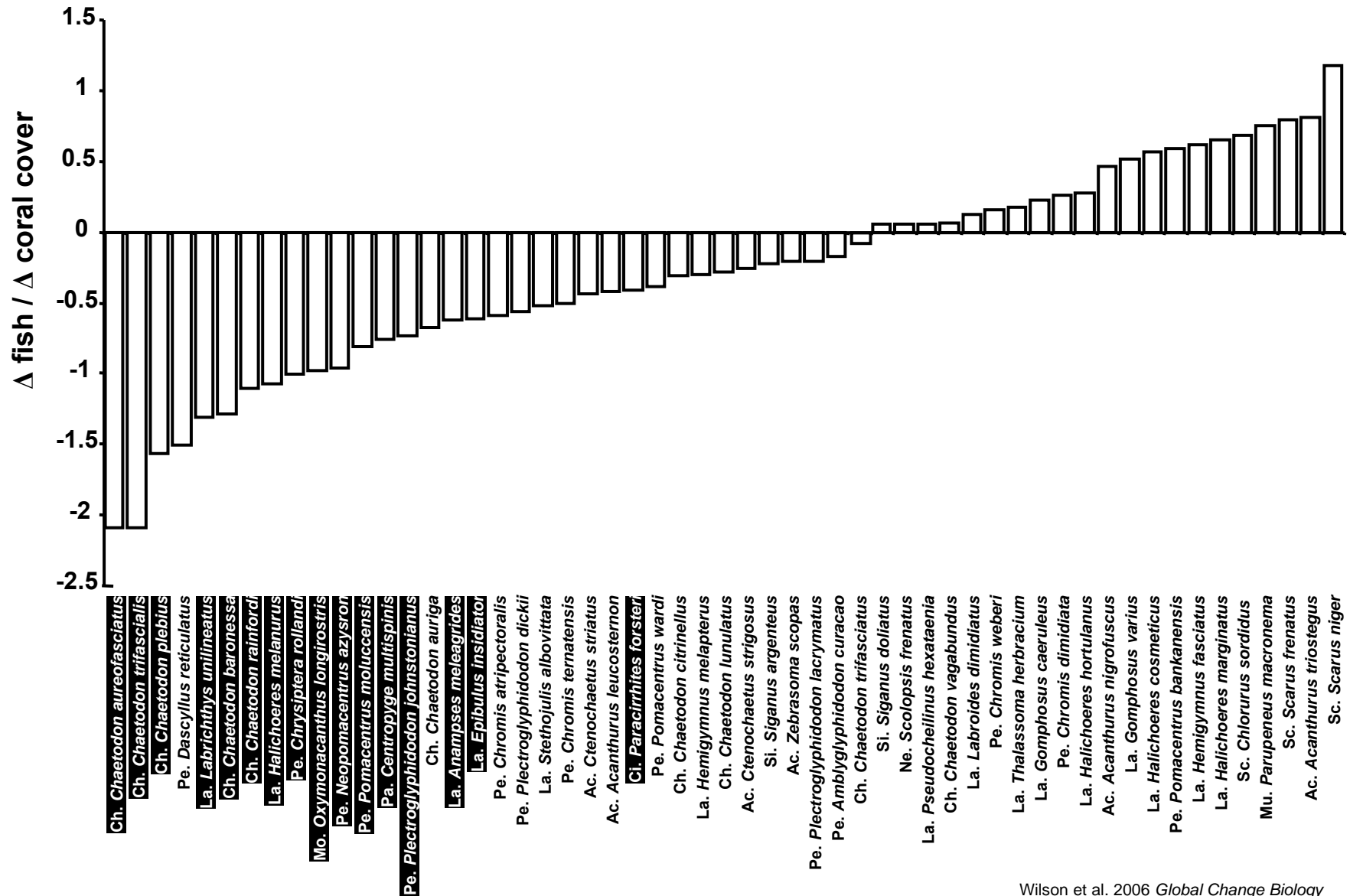


Armstrong 2009 *DEC report*

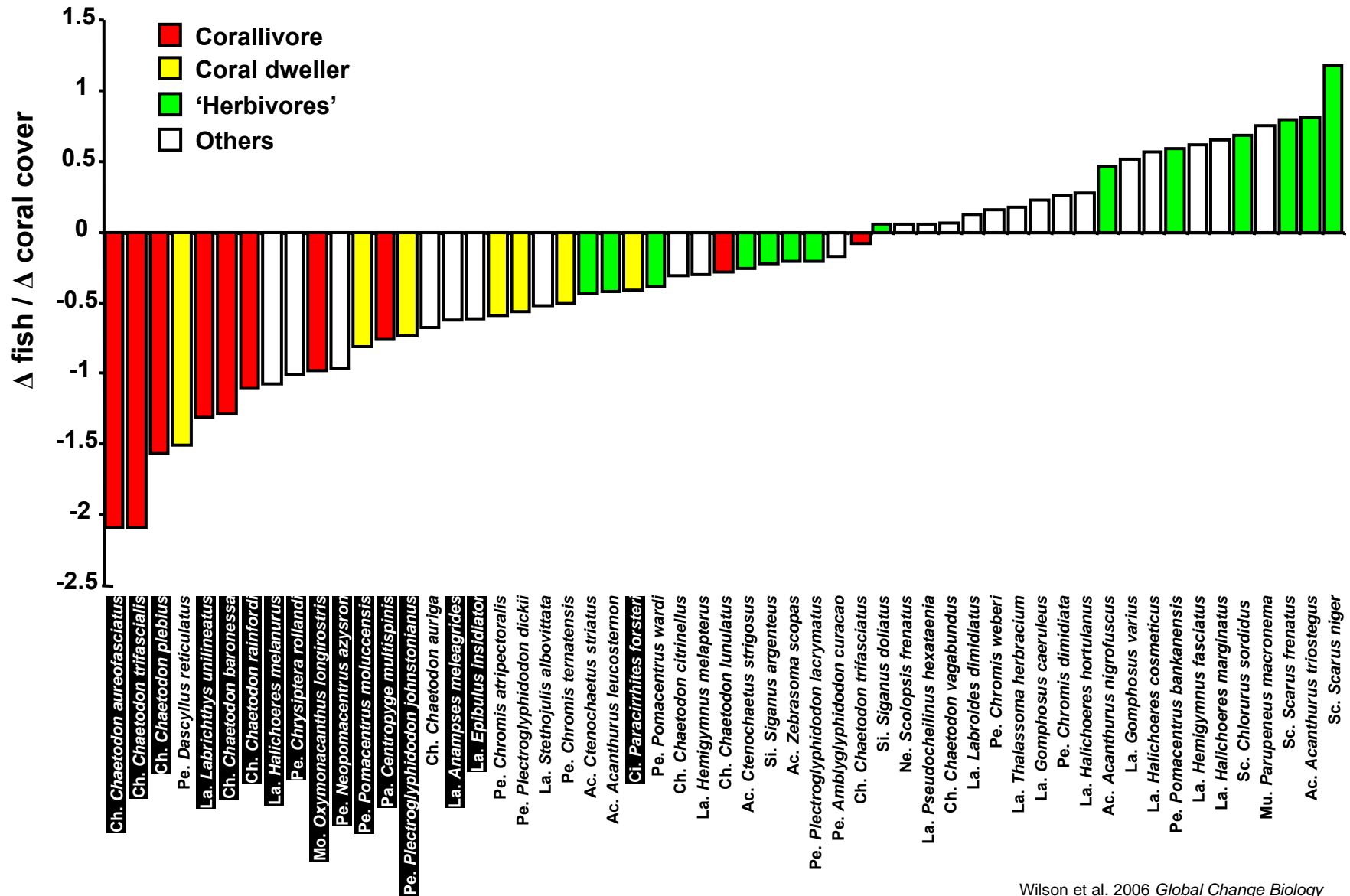


Smith et al. 2008 *Coral Reefs*

# Fish response to coral loss: Meta analysis of existing information



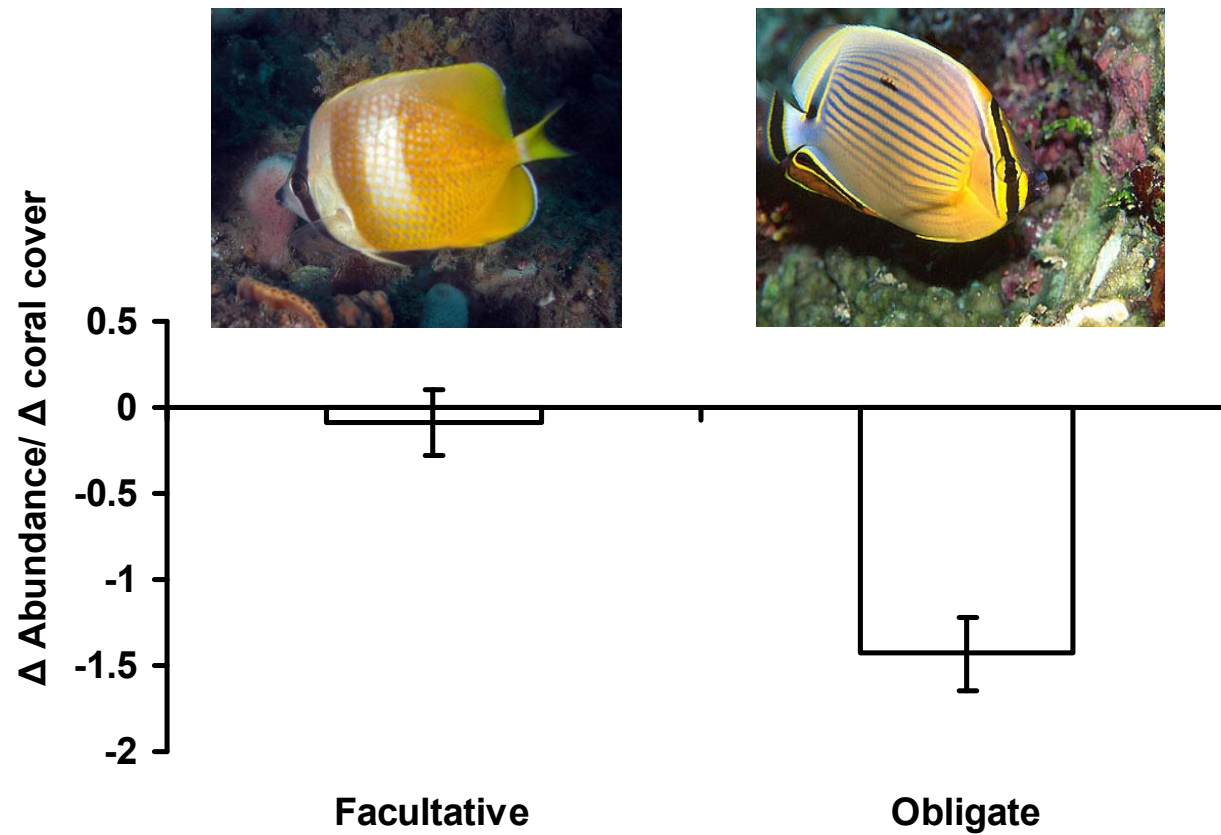
# Fish response to coral loss: Meta analysis of existing information



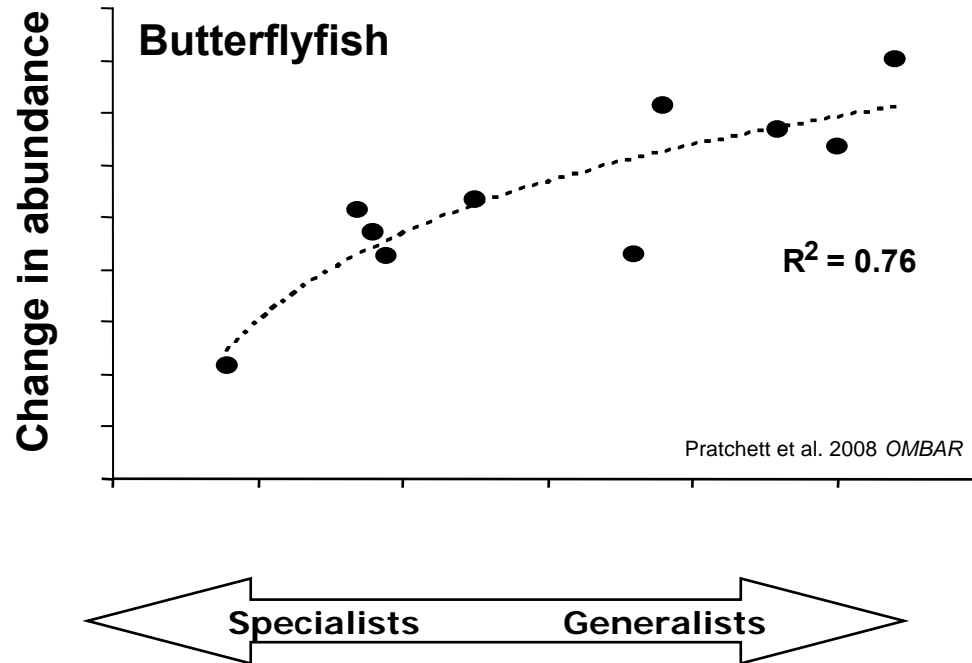
# Why do coral dependent fish vary in their response to coral loss?

## - Ecological versatility

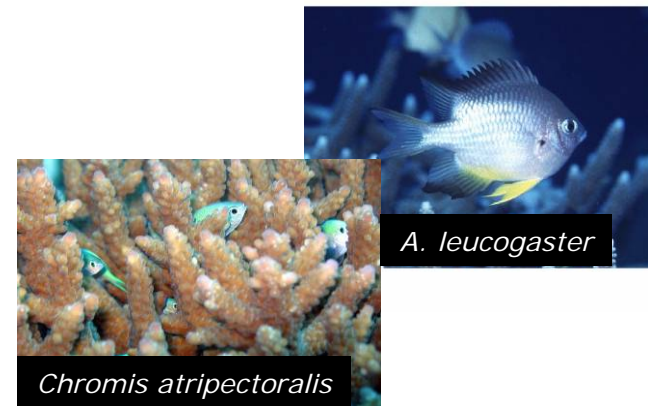
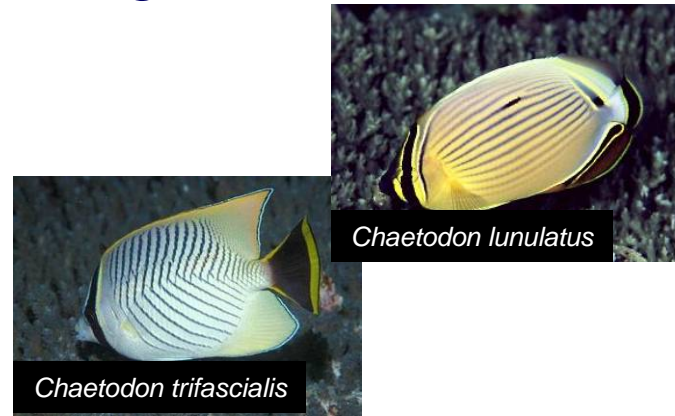
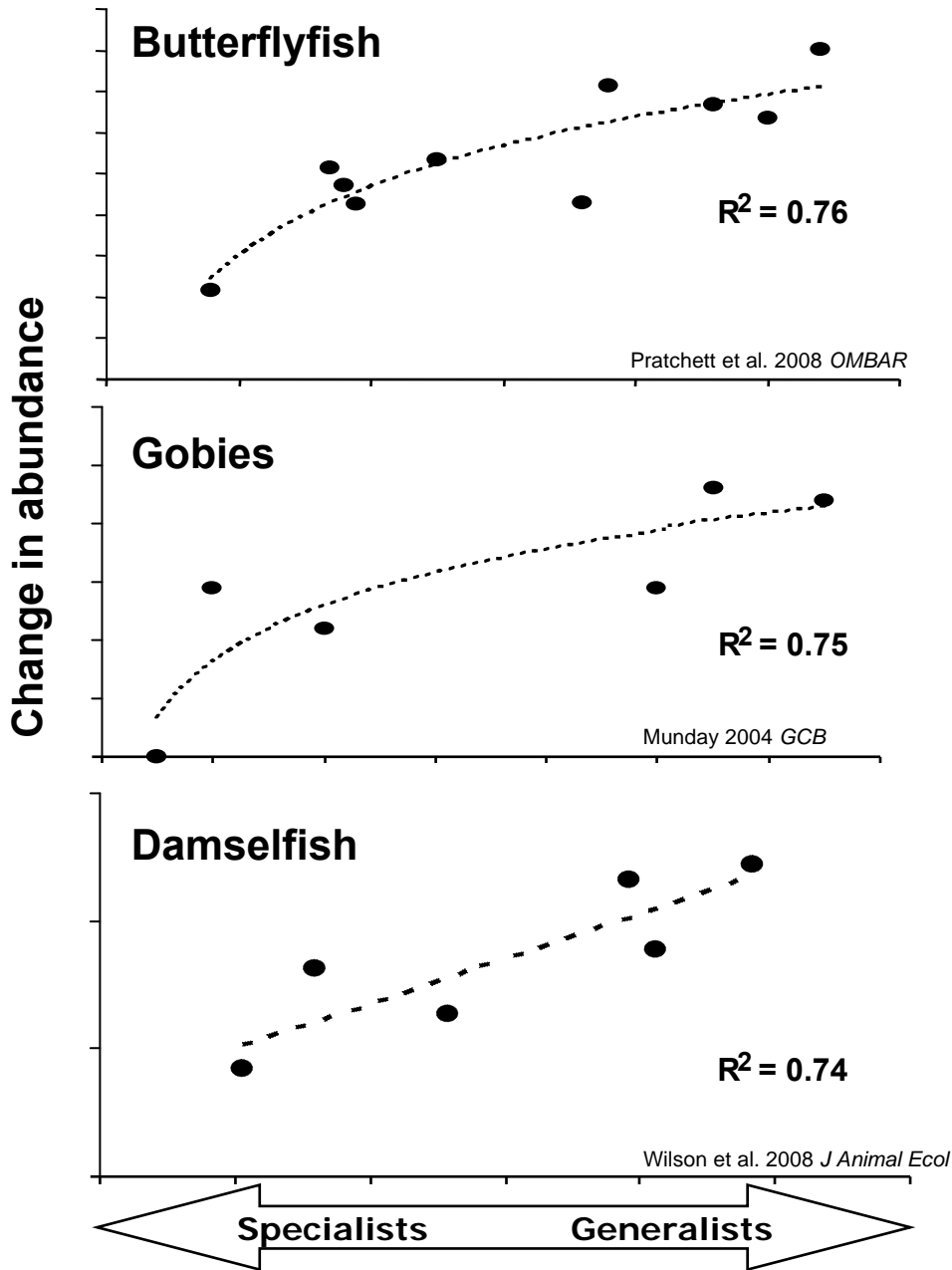
Impact of coral loss on coral feeding butterflyfish



# Ecological versatility

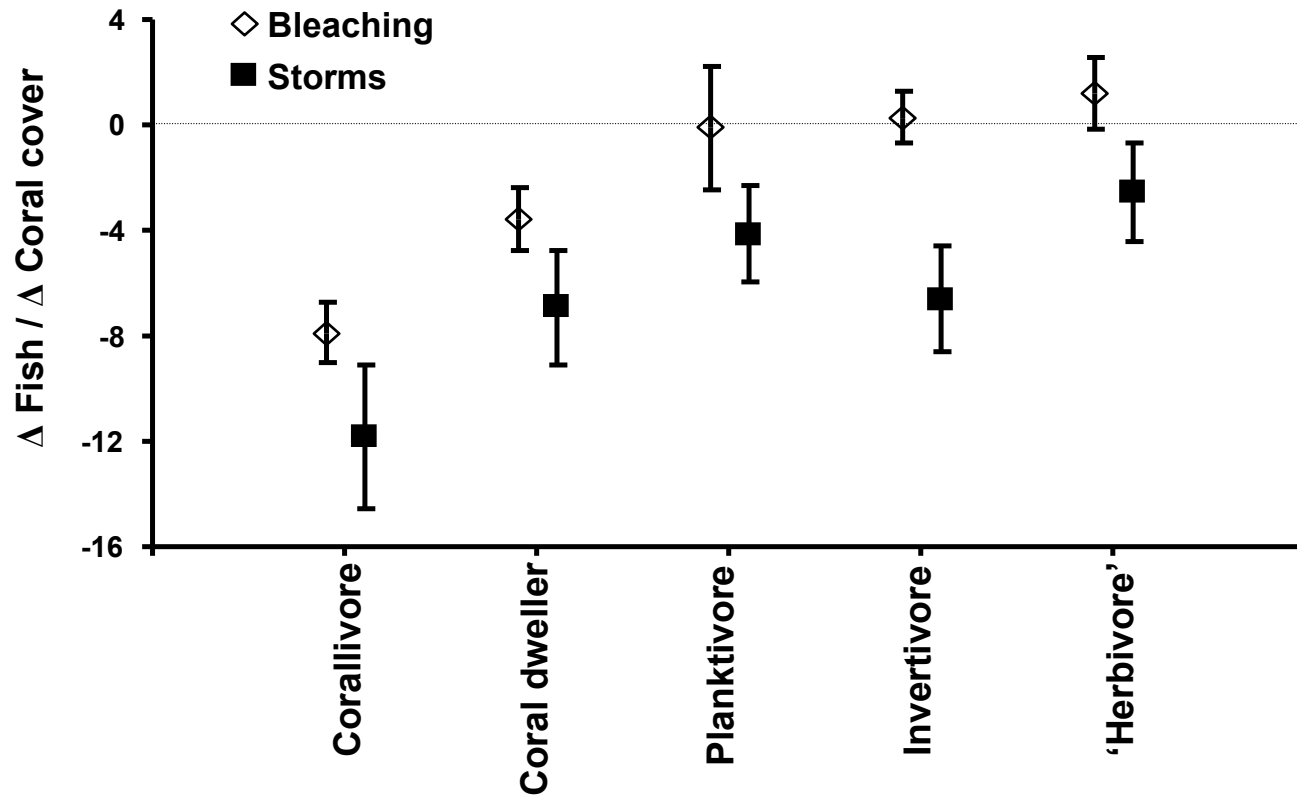


# Ecological versatility

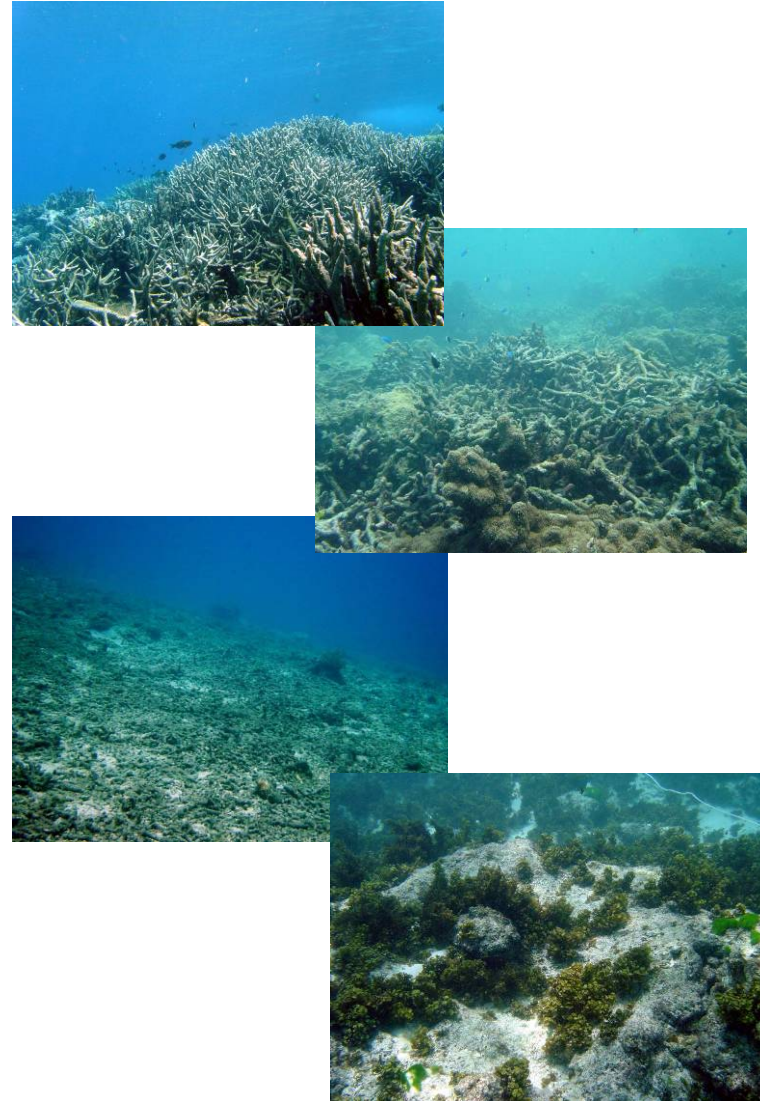
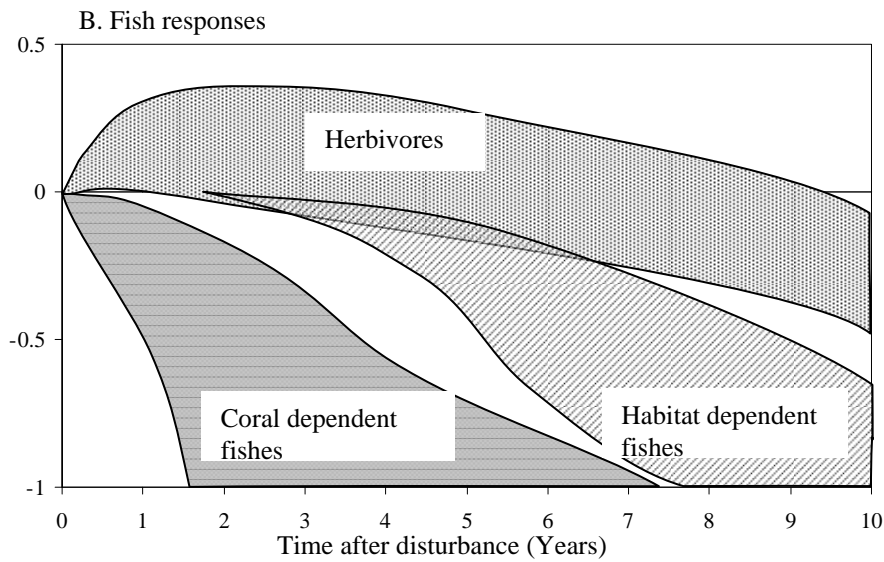
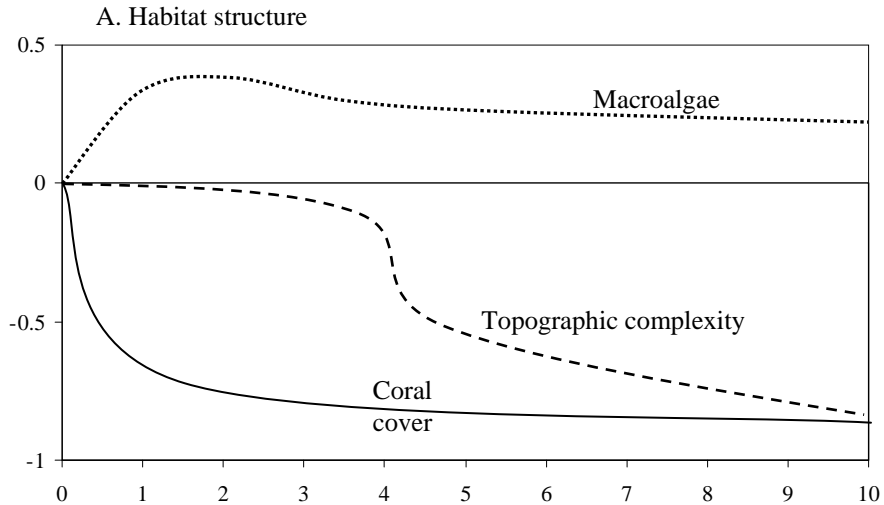


# Impact from different types of disturbances

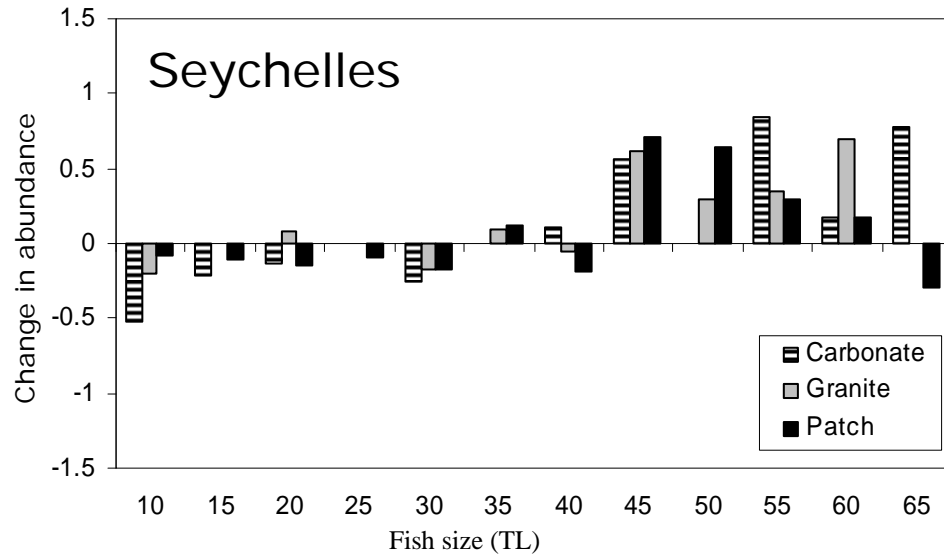
## Bleaching vs. Storms



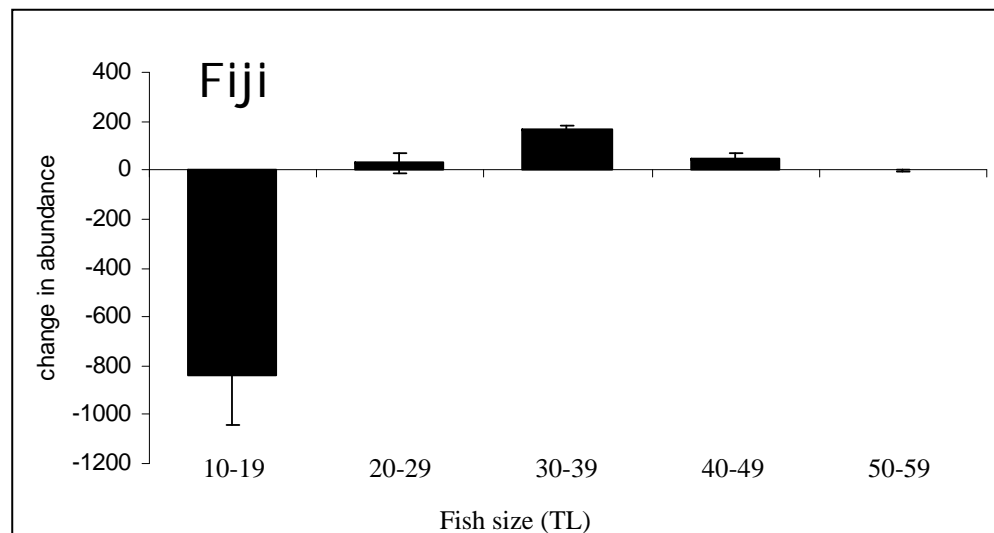
# Long term consequences of coral loss



# Long term consequences of coral loss - Loss of small bodied fish



Graham et al. 2006 *Cons Biol*



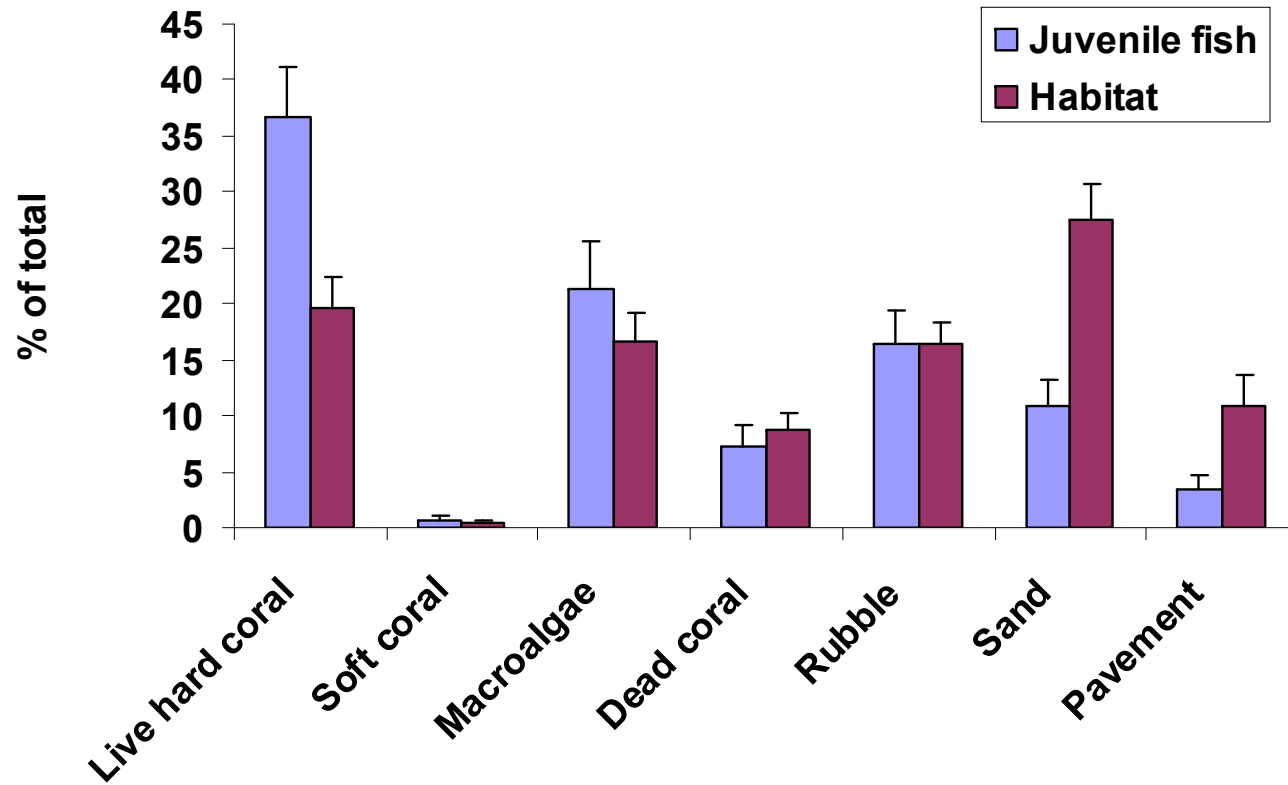
Wilson et al. In review

# Long term coral loss - implications for fish recruits

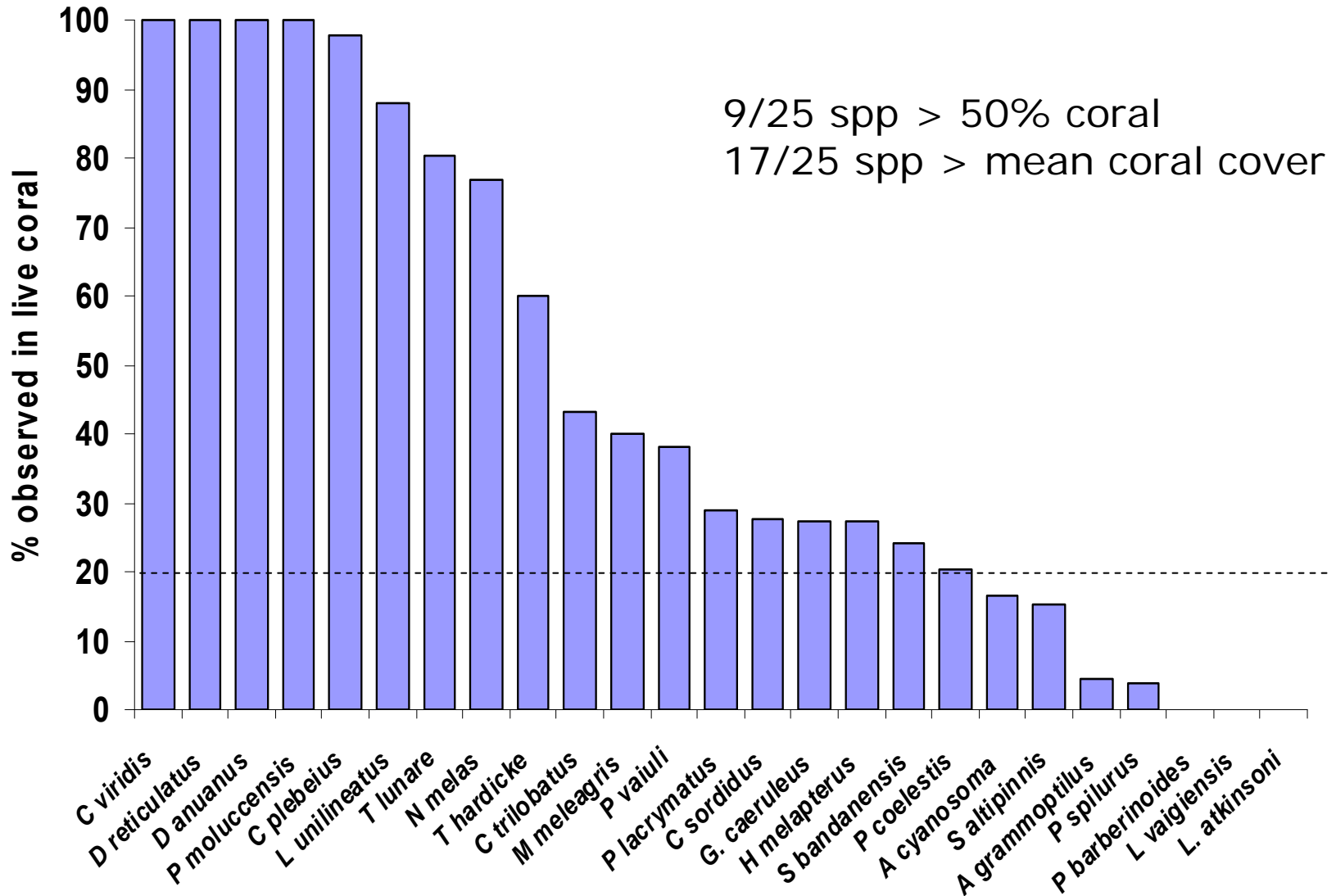


# Habitat associations of juvenile fish - Ningaloo Reef

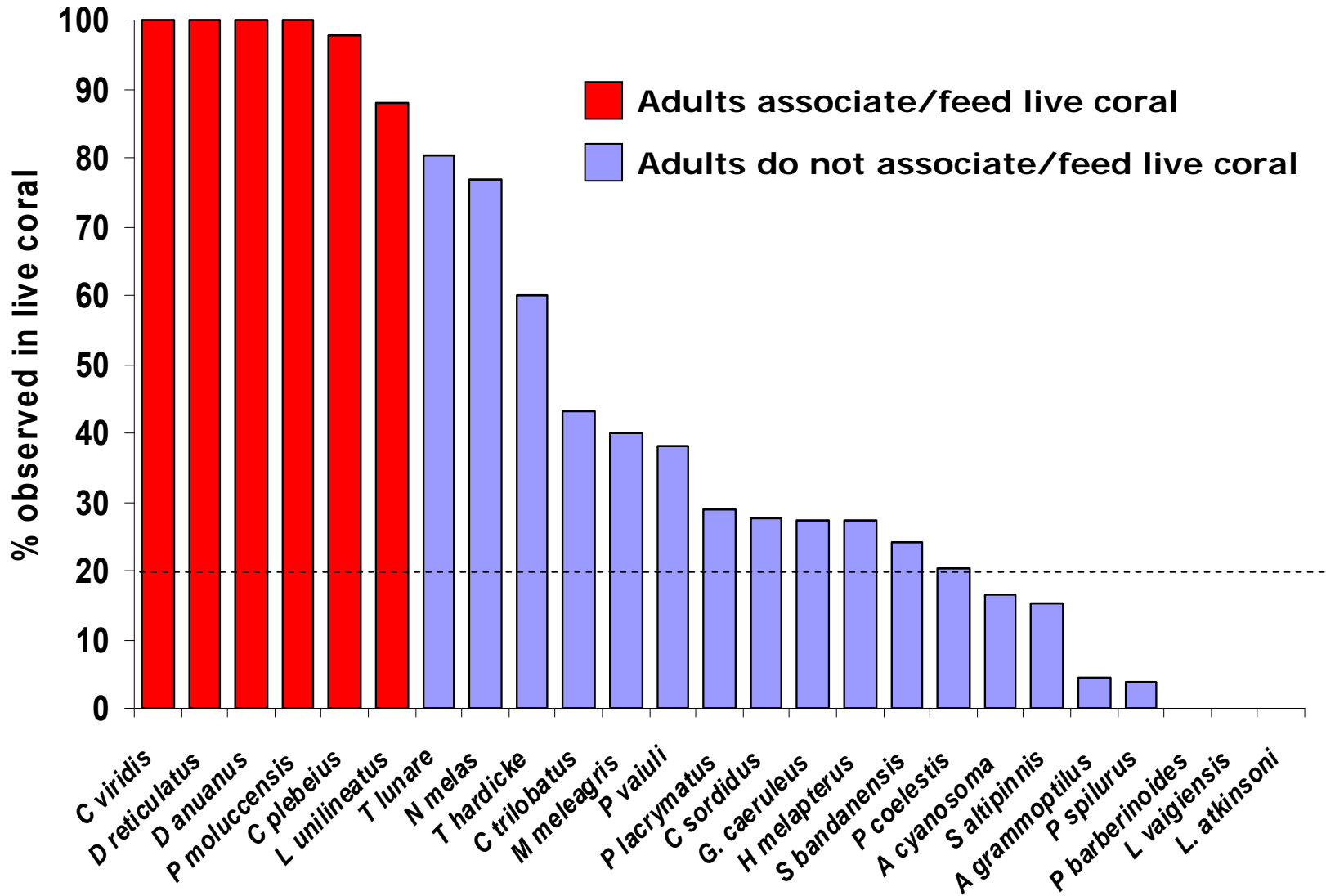
63 transects  
>1000 groups  
>2700 individuals



# Habitat associations of juvenile fish - Ningaloo Reef



# Habitat associations of juvenile fish - Ningaloo Reef





# Summary

- Short term only those species that feed or shelter in live coral will be effected
- Highly specialised species the most severely impacted and at risk of extinction
- Loss of structural complexity (erosion/storms) will effect broader range of species
- Loss of complexity and live coral will impair recruitment and replenishment



# Thanks

**Newcastle University (UK):** Nicholas Graham, Nicholas Polunin

**James Cook University:** Morgan Pratchett, Phillip Munday, Geoff Jones

**Dept. Environment & Conservation:** Tom Holmes, Shannon Armstrong

**AIMS:** Martial Depczynski, Chico Birrell, Paul Tinkler, Rebecca Fisher, LTMT

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**Leverhulme Trust Fund (UK)**

**National Geographic**

**Lau Council (Fiji)**

**Seychelles Fisheries**

**Seychelles Centre for Marine Research and Technology**

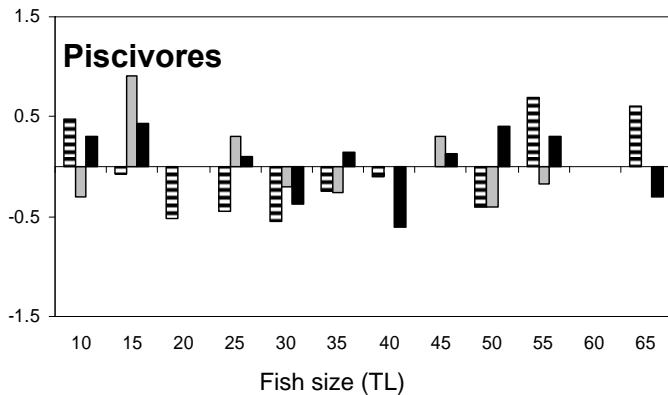
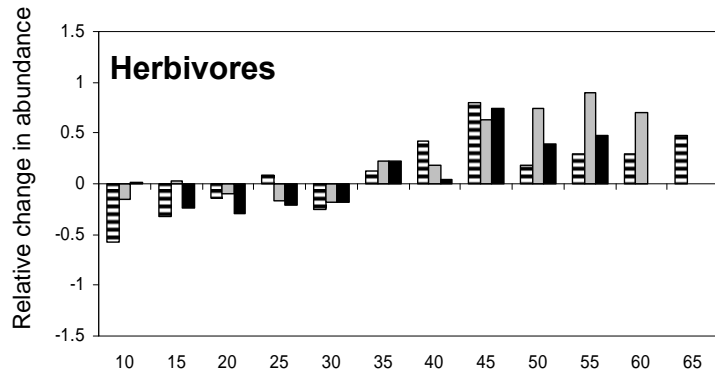
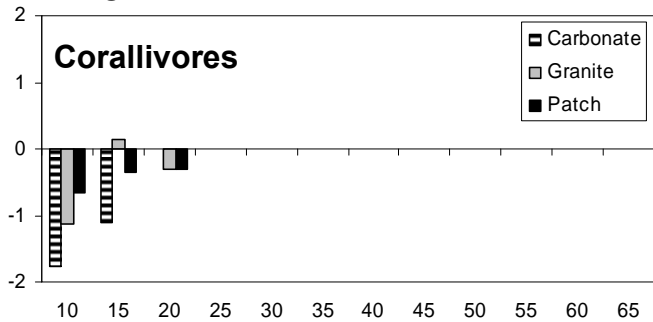
**Nature Seychelles**



# Long term consequences of coral loss

## - Loss of small bodied fish

### Seychelles



### Fiji

