

What do we really know about the functional values of tidal wetlands for fishery species?

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Nursery grounds





Mangroves and fisheries – indirect evidence

Turner 1977

Mumby et al 2004

Manson et al 2005

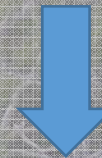
Meynecke et al 2007

Olds et al 2013

Serafy et al 2015

Carrasquilla-Henao & Juanes 2016

Mangroves/Wetlands



Fisheries catch

Reef fish

Reserve performance

**Correlative – do not explain mechanisms or processes
conferring value**



**Food and
Refuge**





Many studies reporting value of mangroves have not sampled in mangroves (Faunce & Serafy 2006)



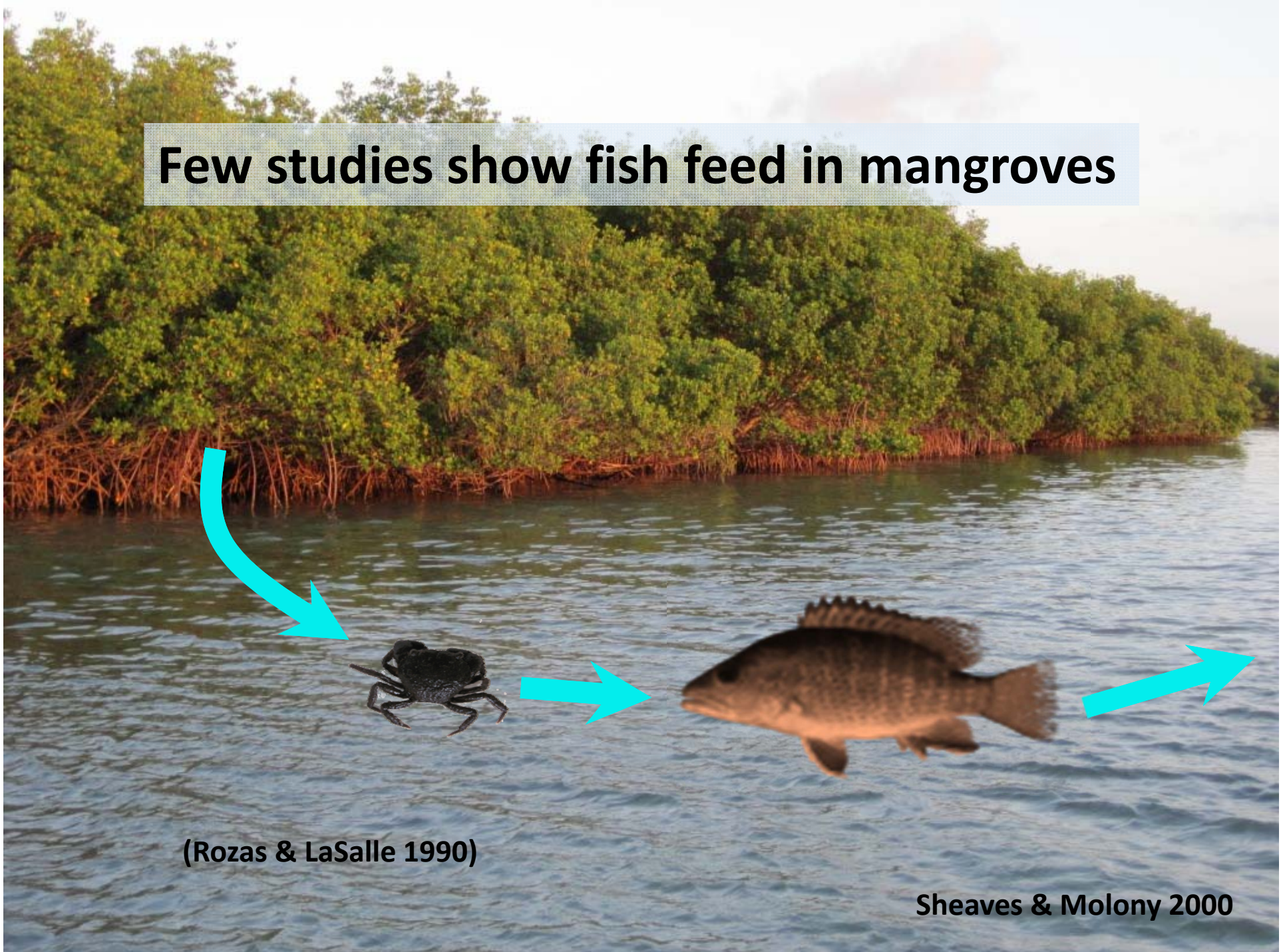
Food and
Refuge





Photo credit: John Parker

Few studies show fish feed in mangroves



(Rozas & LaSalle 1990)

Sheaves & Molony 2000



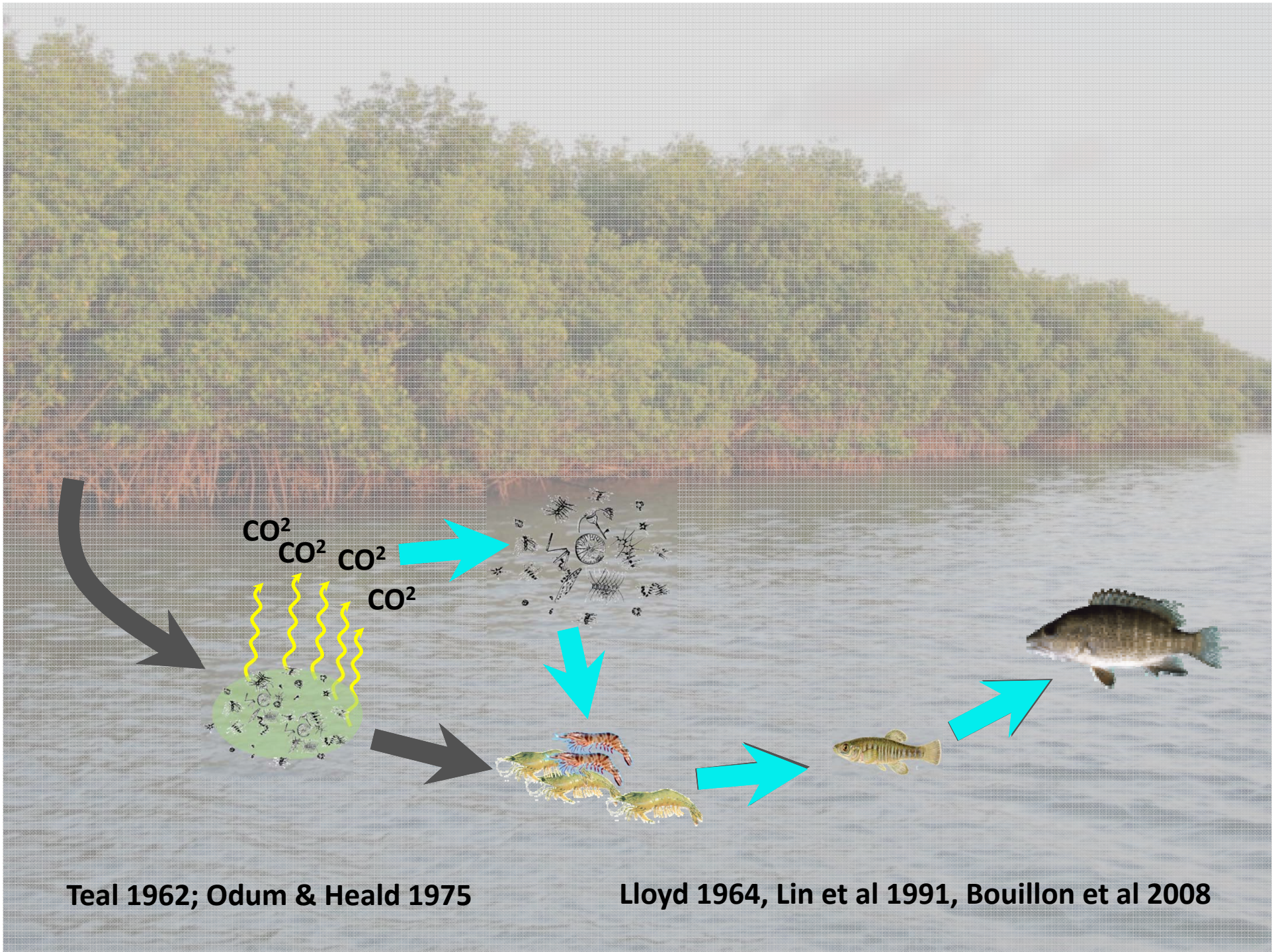
Johnston & Sheaves 2007, 2008

Few fish enter mangroves

Crab-feeding fishery species



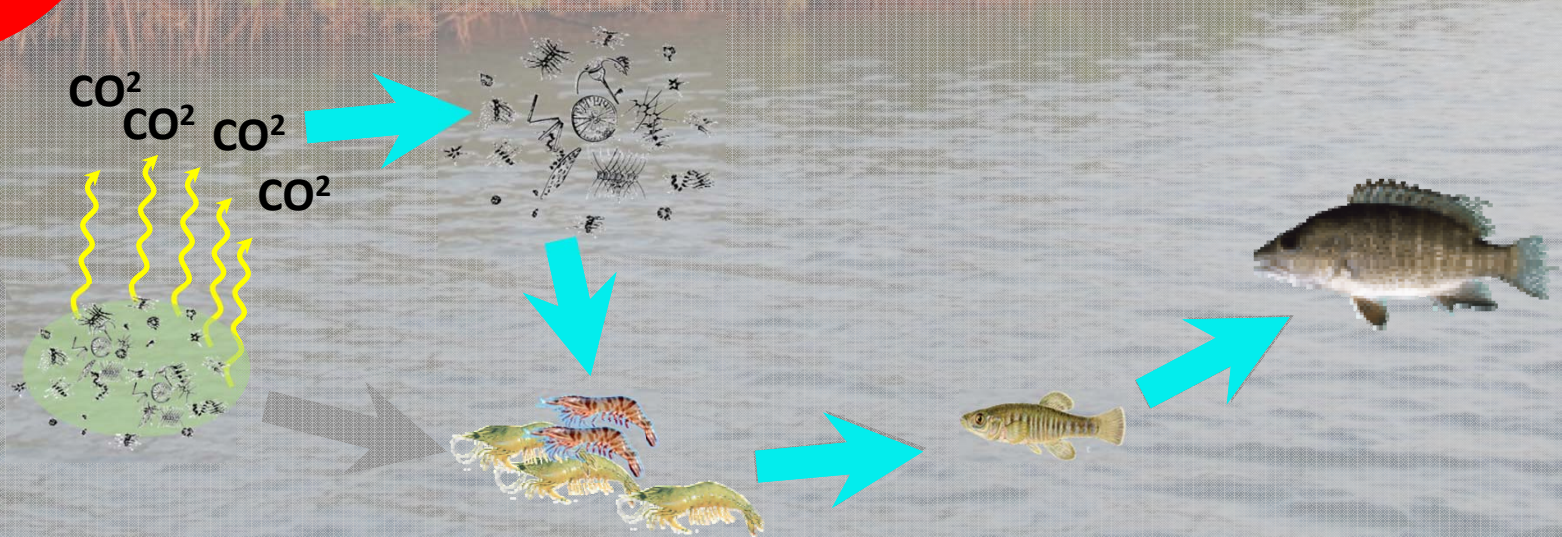
Sheaves et al 2016

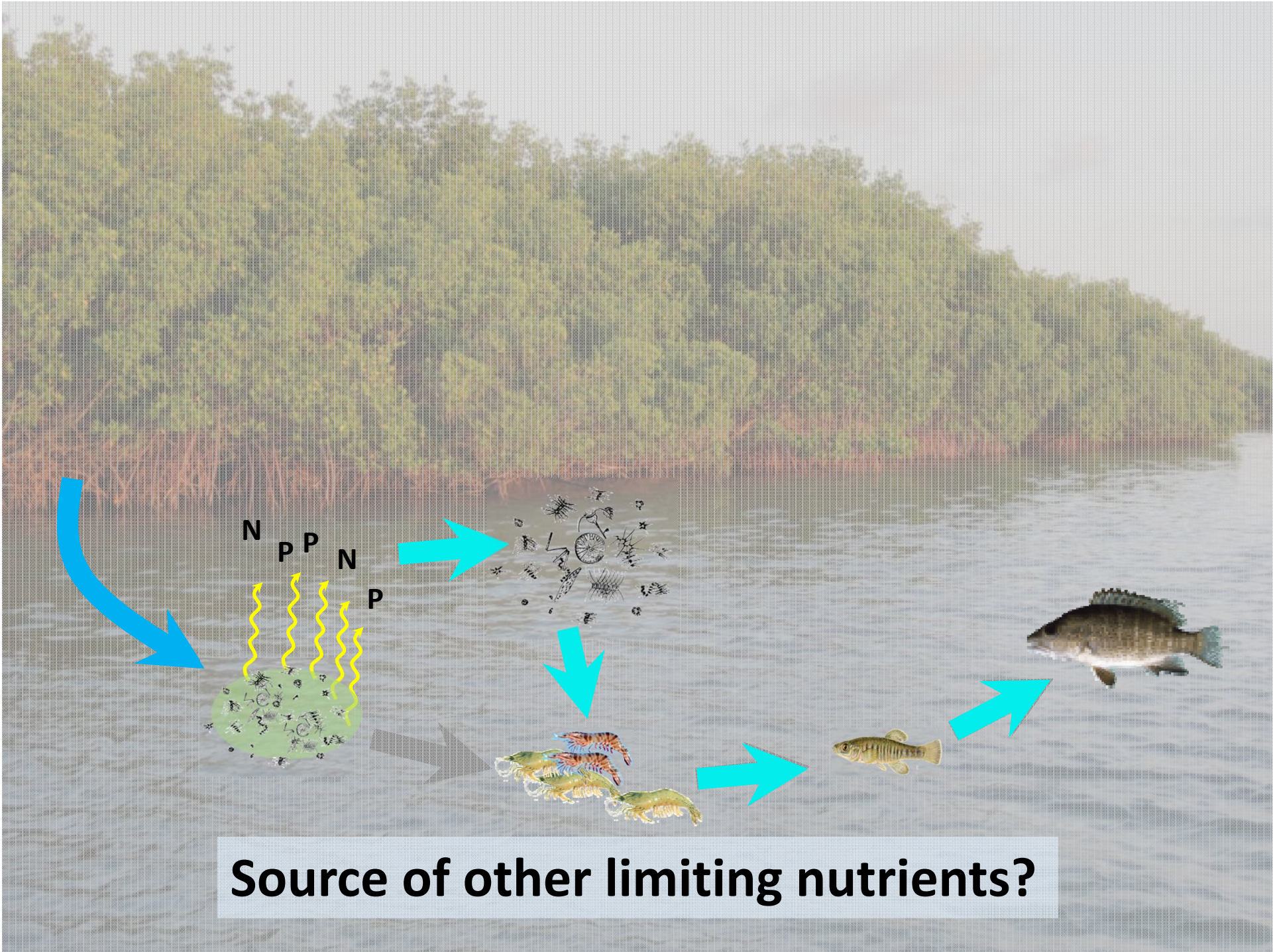


Teal 1962; Odum & Heald 1975

Lloyd 1964, Lin et al 1991, Bouillon et al 2008

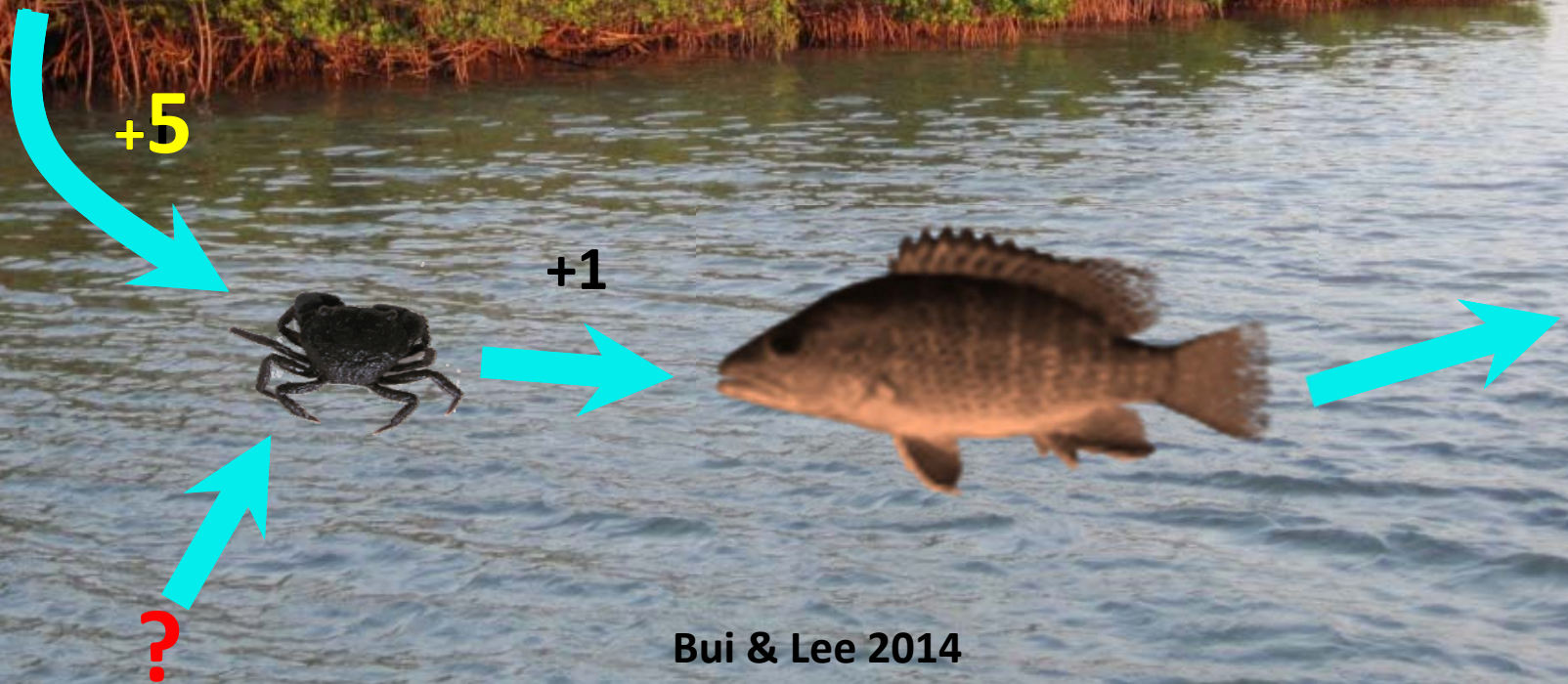
Isotope estimates of mangrove C confounded





Mangrove contributions through crab food chains greatly underestimated

Dominance of herbivorous crabs varies regionally (McIvor & Smith 1995)

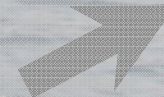
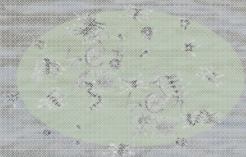


Bui & Lee 2014

Mangroves and fisheries food webs

Clearly important in some places, uncertain in others

Mangrove foodwebs function differently in different regions





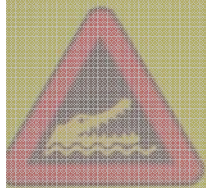
Food and
Refuge





Mangroves as refuge

Little direct evidence



• Crocodiles inhabit this area – attacks may cause injury or death

- Keep away from the water's edge and do not enter the water.
- Take extreme care when launching and retrieving boats.
- Do not clean fish or leave fish waste near the water's edge.

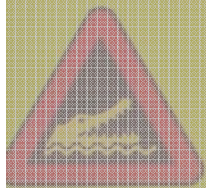
Natural distributions, some support from tank expts. (e.g. Primavera 1997)

Mangrove structure highly variable



Mangroves as refuge

Clear in some cases (e.g. Mclvor & Odum 1988)



Crocodiles inhabit this area – attacks may cause injury or death

- Keep away from the water's edge and do not enter the water.
- Take extreme care when launching and retrieving boats.
- Camp well away from the water.

Good refuge = tiny survival advantage (Levin & Stunz 2005, Baker et al 2014)

Refuge habitat = high predator density, max predation pressure (Baker & Sheaves 2007, 2009)

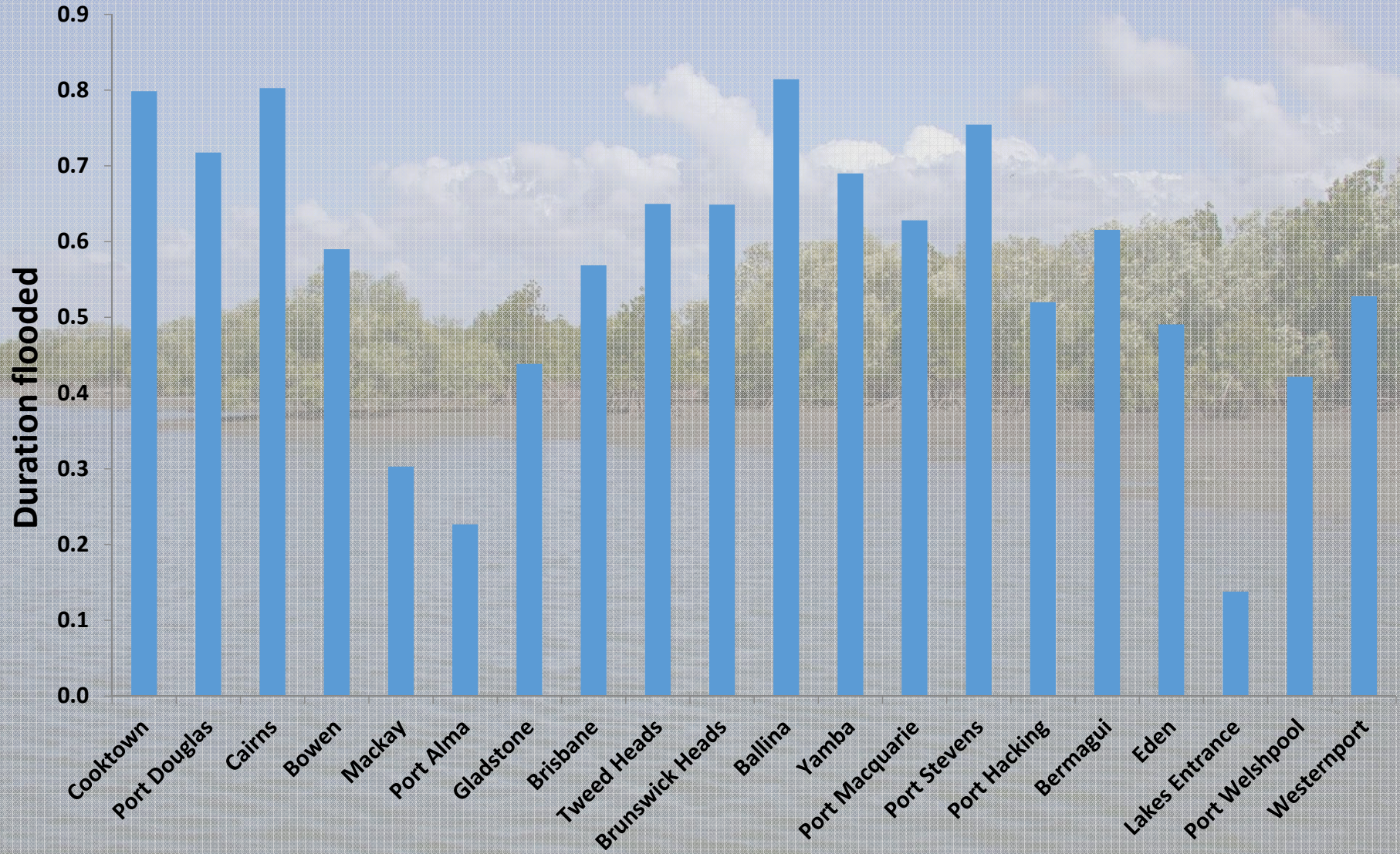
Extremely difficult to measure what predation pressure would be if fish behaved differently







Tidal flooding/access to mangroves varies substantially - Baker et al 2015





Functional values must vary

Tidal access, physical structure, species assemblages

New (and old) approaches to fundamental questions

Diet, isotopes, prey distribution, habitat use

Drivers of regional variation

**Mangroves as ecosystems, components of coastal seascapes
supporting fisheries**

THANK YOU

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