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North West Shoals to Shore Research Program

Genetic connectivity of the silver-lipped pearl oyster *Pinctada maxima*

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Background & History

The only wild-capture pearl oyster fishery in the world

‘riji’

Harvesting of pearl oysters dates back thousands of years

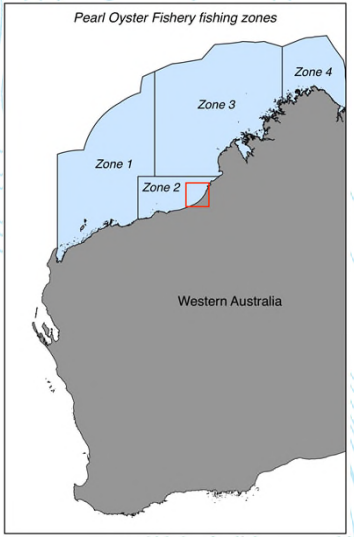
Cultured pearls

1916

500,000

Hand collected

< 35 meters



Images from http://www.paspaleygroup.com and Western Australian Museum

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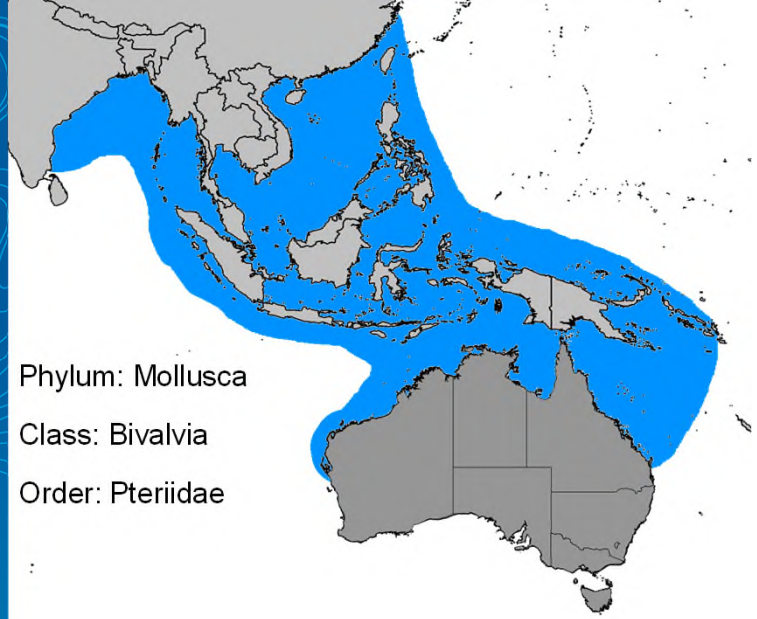
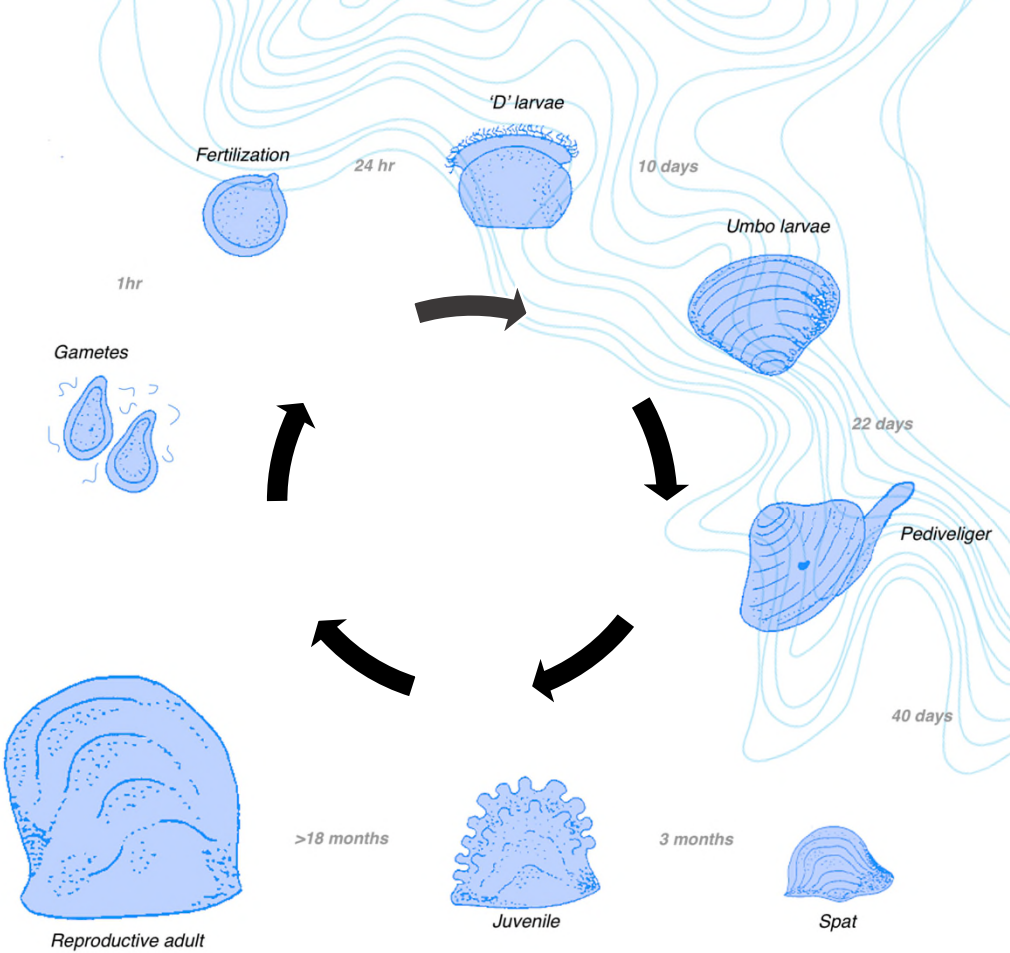


Phylum: Mollusca

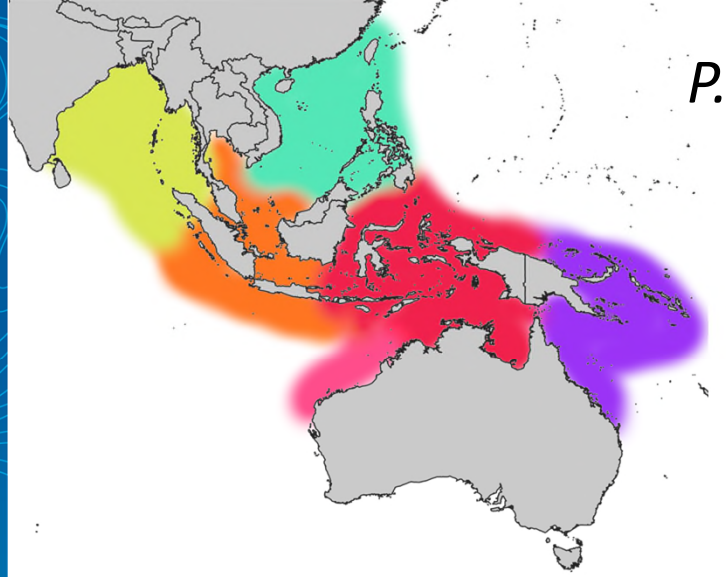
Class: Bivalvia

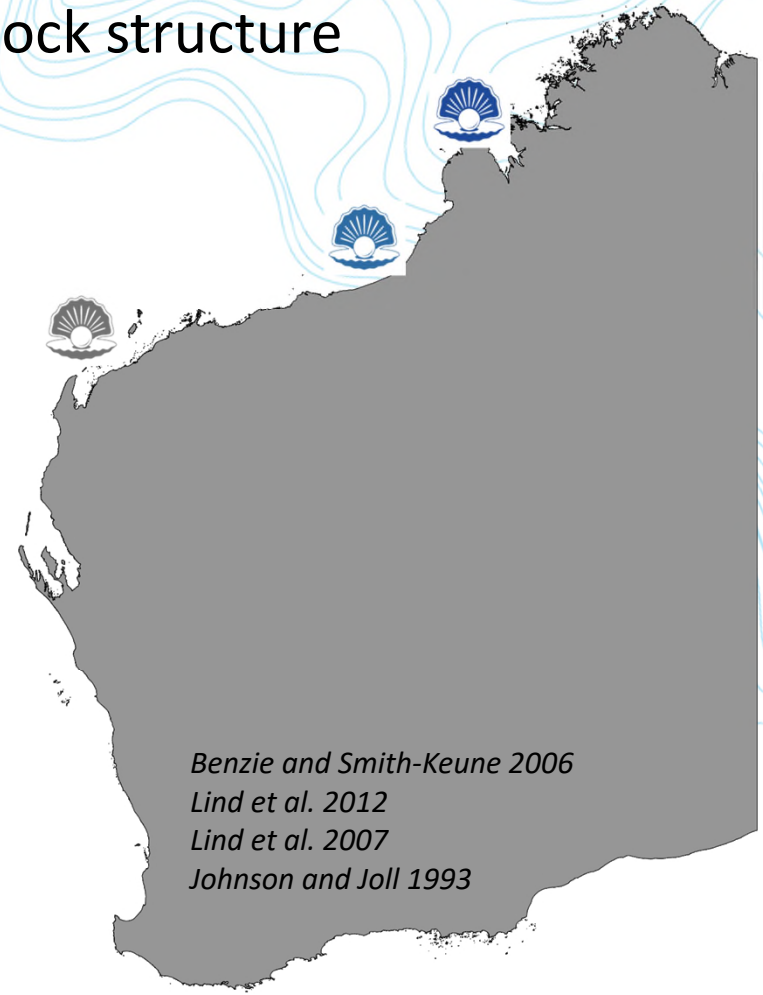
Order: Pteriidae

Pinctada maxima



P. maxima stock structure





Benzie and Smith-Keune 2006
Lind et al. 2012
Lind et al. 2007
Johnson and Joll 1993

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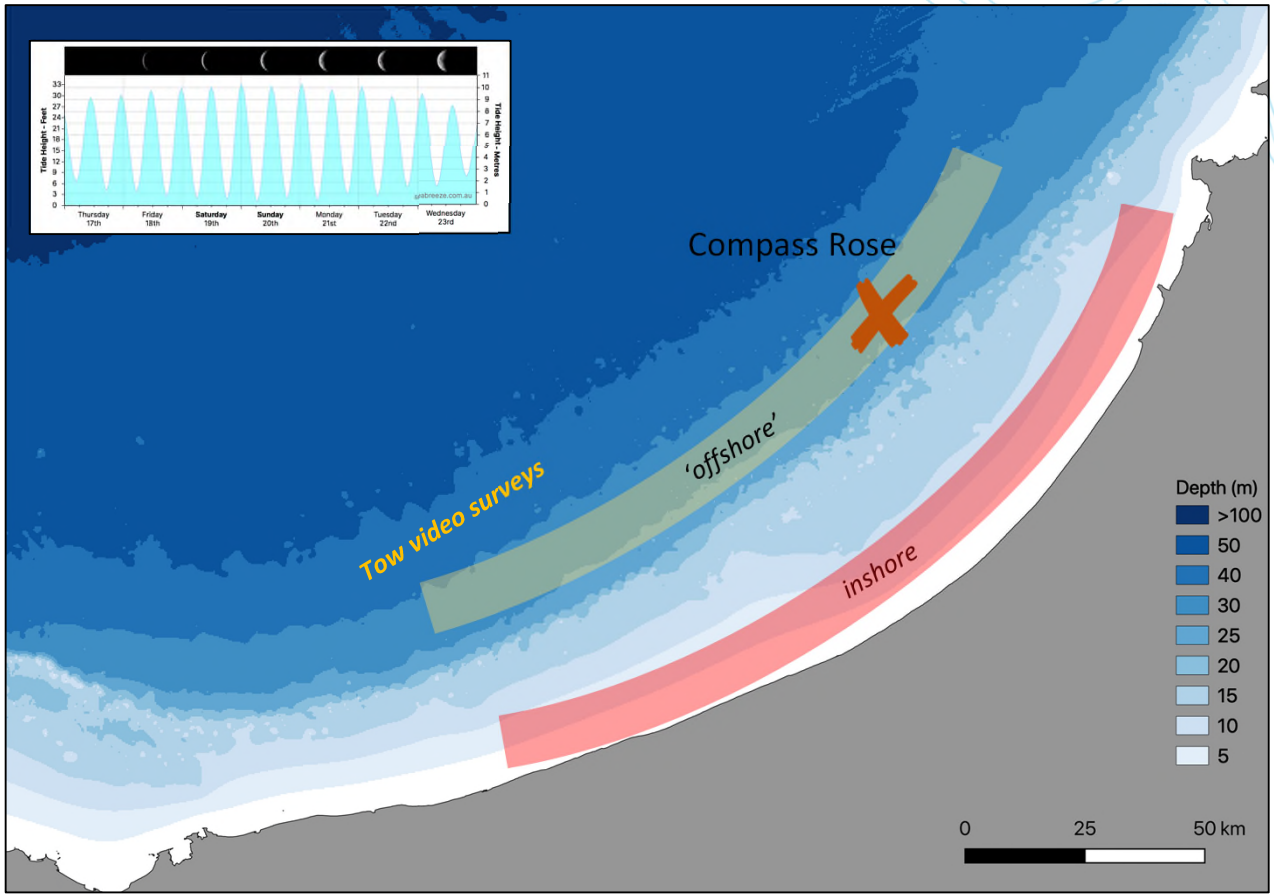
Eighty Mile Beach, Western Australia



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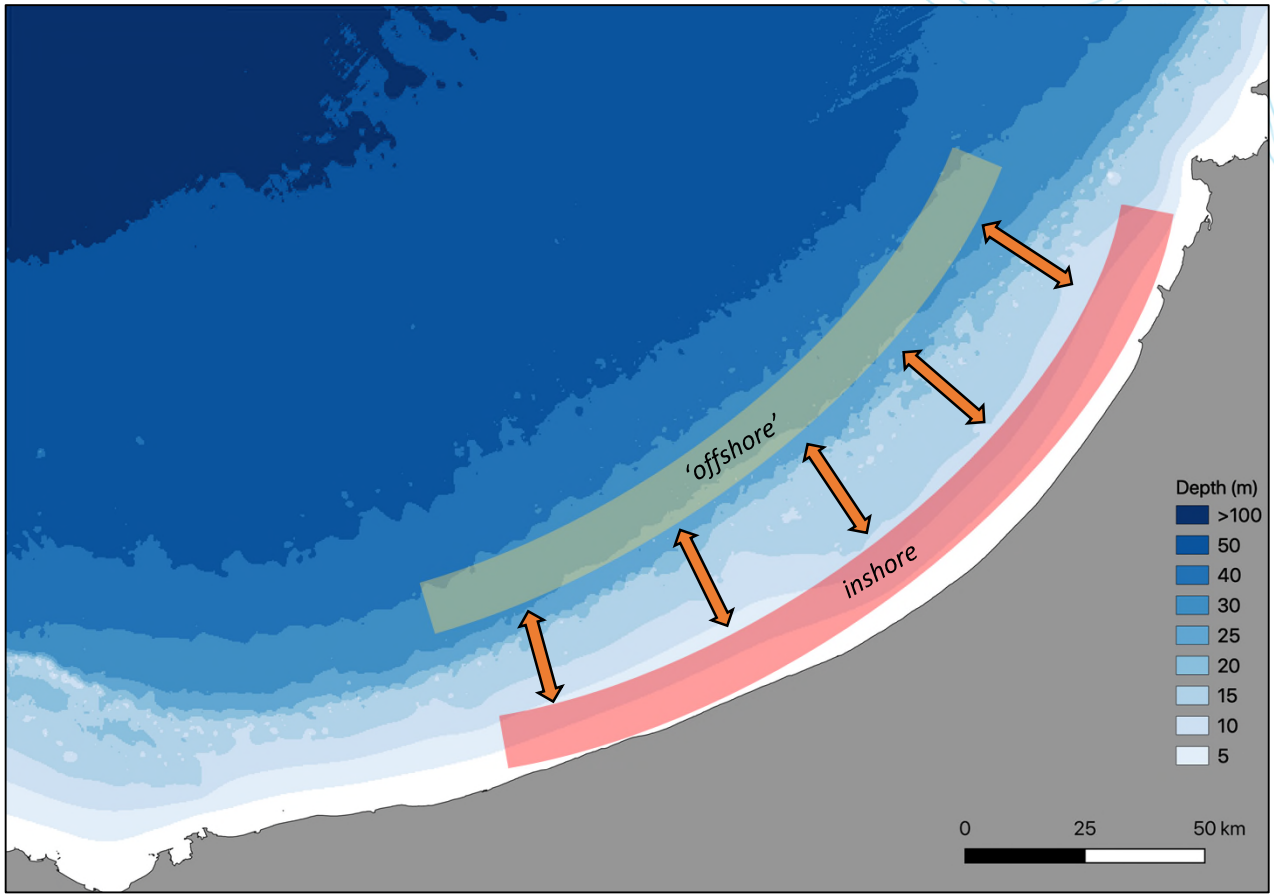
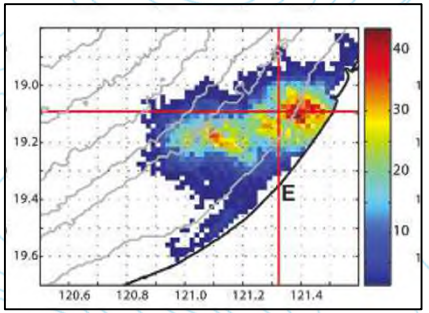
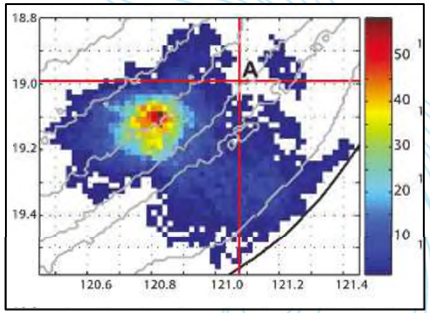
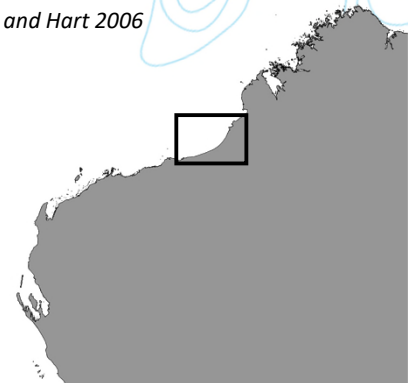
How connected are deep and shallow populations?





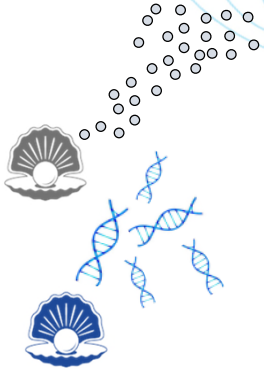


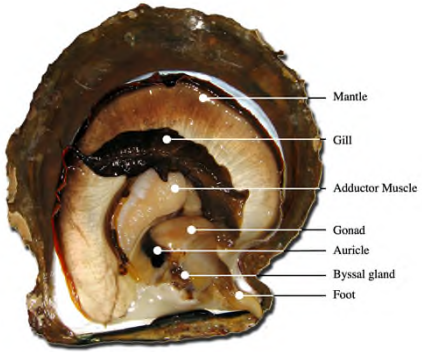
Condie and Hart 2006

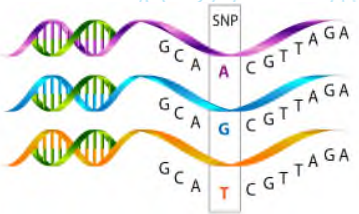


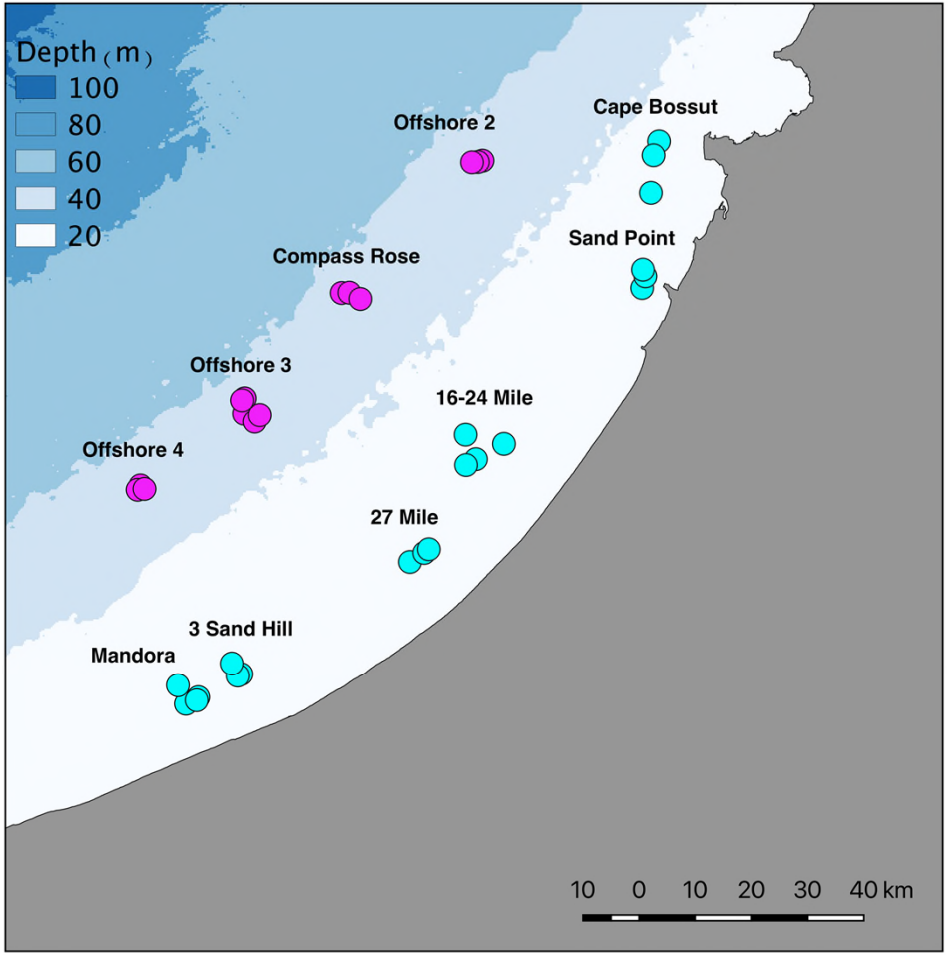
How connected are deep and shallow populations?

- Cannot directly track individual larvae
- But we can infer connectivity from DNA









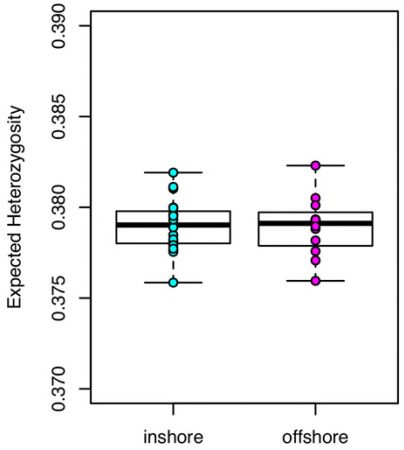
Industry divers

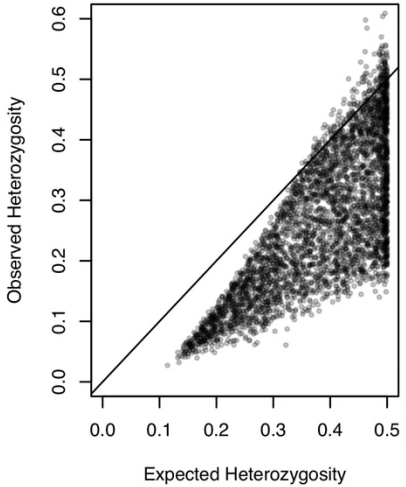
x 715

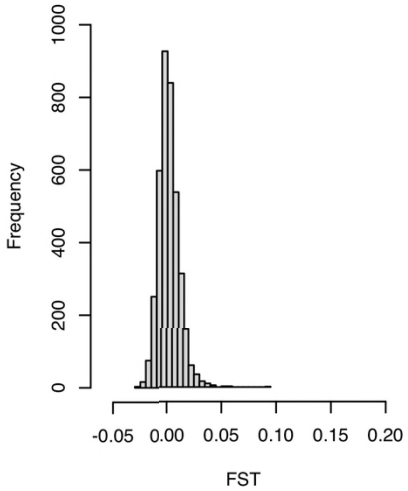
x 33

x 10

x 2







No differences in genetic diversity

Lots of inbreeding!

Overall weak genetic structure

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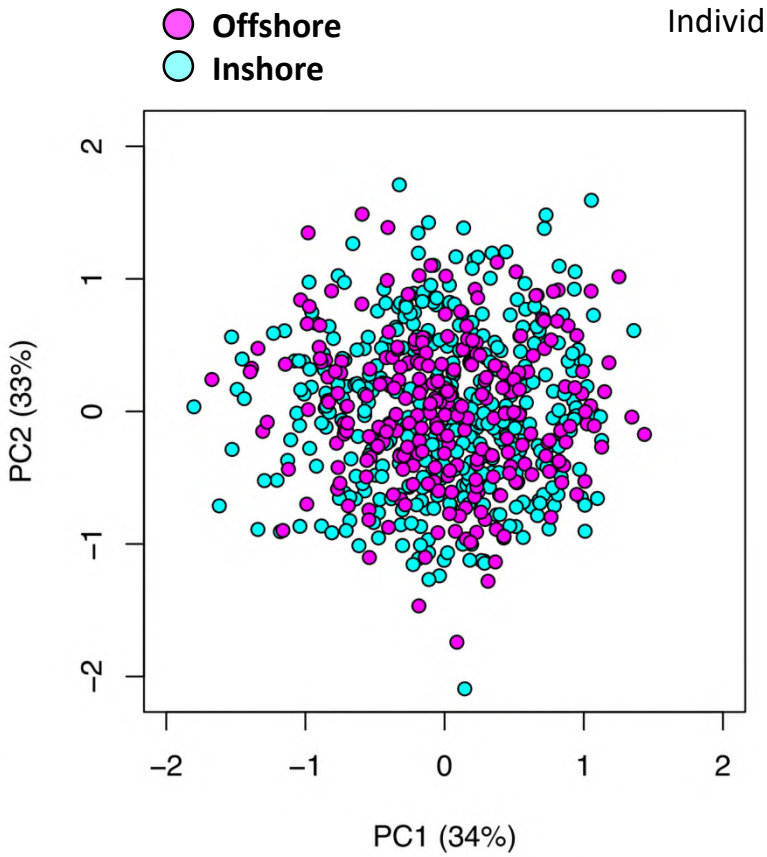
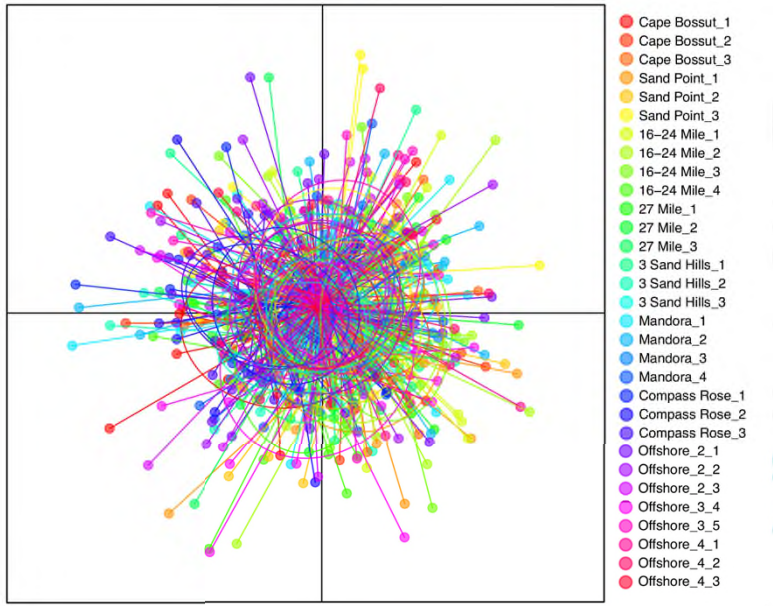
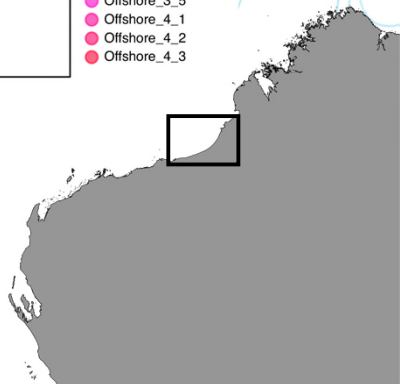
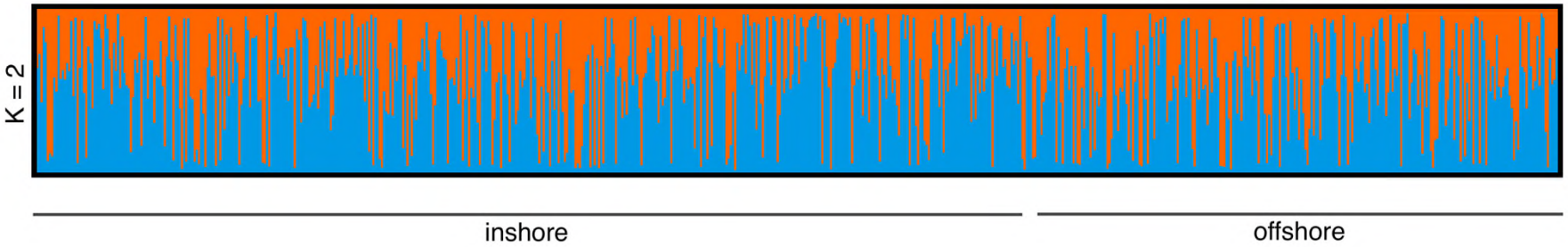
Individual-based analyses





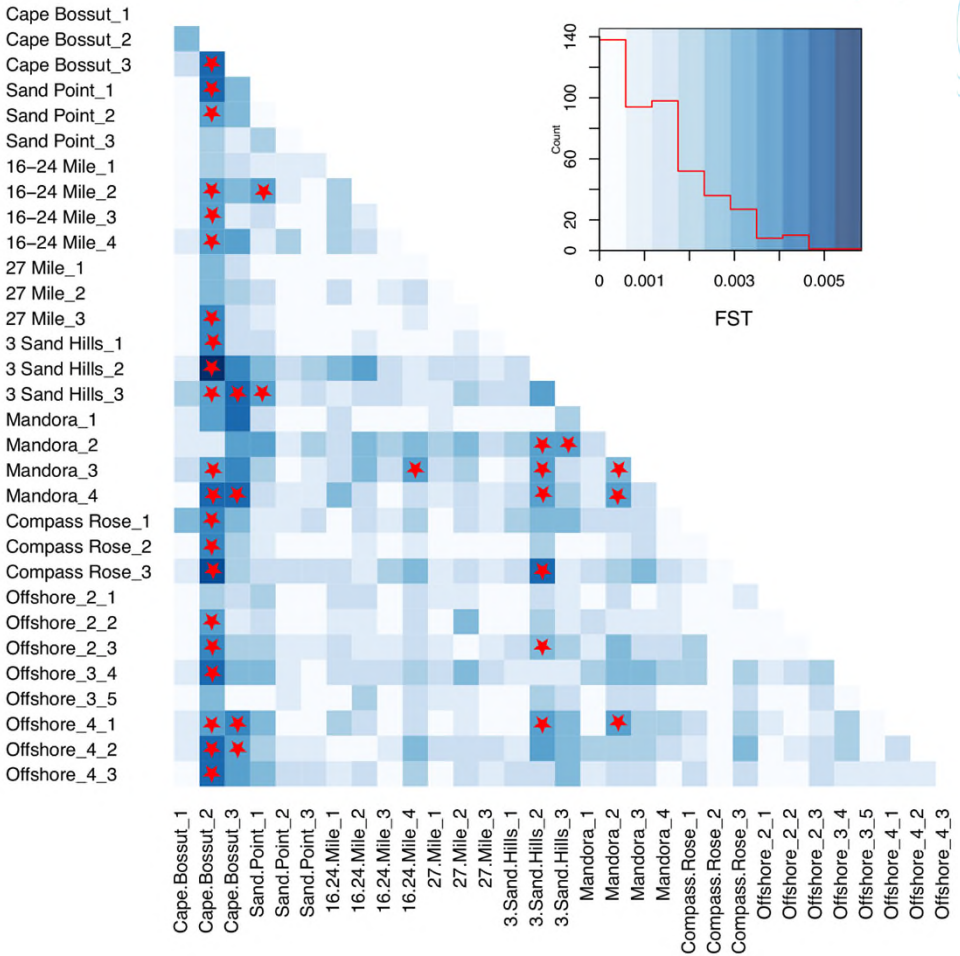


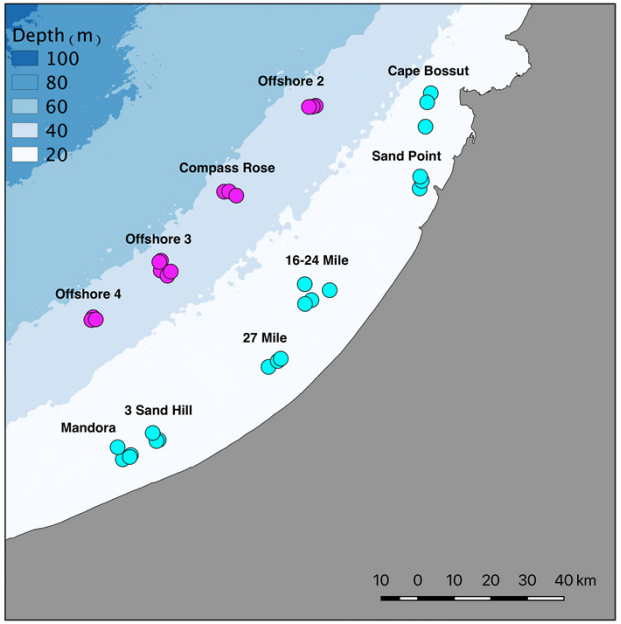
Individual-based analyses



In a perfect world…

population-based analyses





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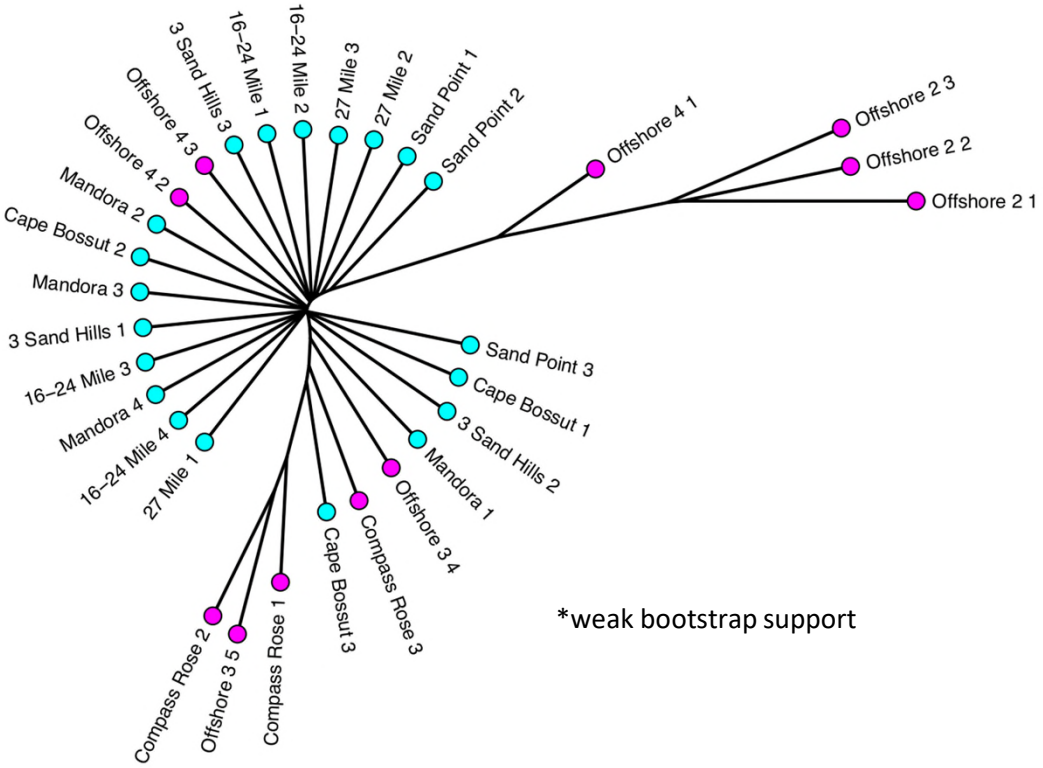
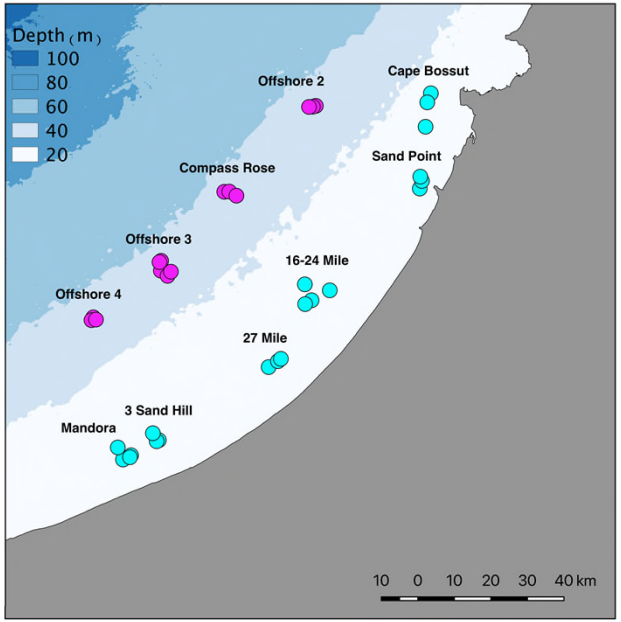
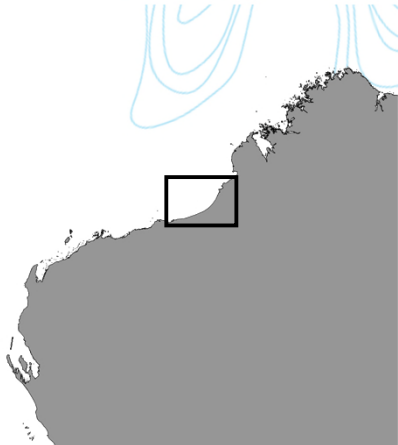
population-based analyses



*weak bootstrap support





How connected are deep and shallow populations?

- Population structure is fluid
- Successive dispersal events over generations homogenize population
- Part of a larger metapopulation that fluctuates through time
- Temporal monitoring of these populations

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AIMS: Australia's tropical marine research agency.

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