Research questions: Part 2



Is the legally defined AC125 dominated by hard substrate and high structural complexity?



Are benthic groups and habitats more abundant and diverse on the AC125 rather than in adjacent deeper or shallower waters?



Is fish diversity and abundance greater on the AC125 than in adjacent deeper or shallower waters?



Are fish species of fisheries and conservation importance found on the AC125?









- Baited remote underwater video stations (204 BRUVS) on and off the AC125
- Record habitat in the field of view







Methods

Fish data analysis

- Fish species richness, abundance and composition on the AC125 vs the habitats immediately adjacent?
- Latitudinal variation in fish communities along the AC125?
- Do species of fishery and conservation importance occur?

Predictors: AC125 position (on, off shallow, off deep), sampling Area (latitude), depth, habitat (% benthos, % substrate categories) (multibeam bathymetry: spatial modelling)

- Generalized additive mixed models (GAMMs)
- Spatial modelling (benthic analysis approach for richness)
- Distance-based redundancy analyses (dbRDA)
- Compared to model focused on AC125 position





Methods

- Predictor maps extracted from bathymetry data
- BRUVS data used to build and validate a model
- Machine learning techniques used to predict species richness



Results

Area 2

a) On AC125

Area 3

Area 5



b) On AC125 c) Off Shallow d) Off Shallow f) Off Deep e) Off Shallow

Area 2

Area 4

Area 5

Fish diversity (richness)

Position	# of species
Off AC125 Shallow	107 (76%)
On AC125	75 (53%)
Off AC125 Deep	63 (45%)

Highest in Areas 1 and 2 at shallow sites off AC125







Models: More species at shallow sites with higher complex substrate



Rubble (% cover)

Predicted fish species richness





- Areas 1 and 2 had high species richness on or near AC125
- Areas 3 and 4 had lowest species richness on AC125 overall

Environmental drivers of species richness

- Higher species richness in shallower water
- Associated with largescale habitat complexity





Relative abundance

- Fishes were more abundant (on average) at shallow sites off AC125
- Associated most with increasing benthos cover (complexity)





Common species abundance



Fish community composition



- Australian Governm
- Varied significantly with Area (latitude), depth, and cover of rubble and boulder/reef substrate – NOT AC125 position (on vs off AC125)

Species of fishery and conservation importance?







Conclusions – Fish



Is fish diversity and abundance greater on the AC125 than in adjacent deeper or shallower waters?



Fishes were more abundant and diverse in areas shallower than the AC125



<u>Fishes were associated with</u>: shallower depths, presence of benthic biota & complex substrate at both local and broad spatial scales



Are fish species of fisheries and conservation importance found on the AC125?

Yes – these were observed on and adjacent to the AC125







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Conclusions:

Hard substrate was rare



 Parts of the Ancient Coastline may be buried



 Benthic groups and habitats were patchy in distribution, though not entirely absent



- Fishes were representative of mesophotic habitats on the North West Shelf
- Areas shallower than the AC125 could be considered in management to capture greater diversity