Coral recruitment in the Northern Pilbara

Damian.Thomson@csiro.au
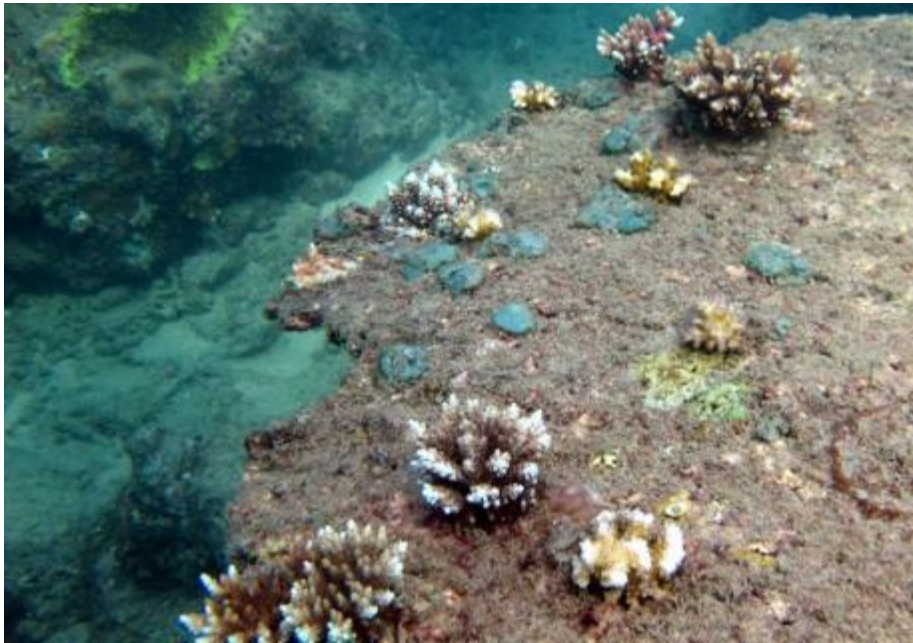
Why look at coral recruitment

Fundamental for maintaining resilient communities

Why look at coral recruitment

"A decade of intense assessment" WA Blueprint 2050

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SKM (2010). Proposed Outer Harbour Development Port Hedland - Coral spawning spr surveys 2009 Revision B - WV03716-MV-RP-0041 04, June 2010.

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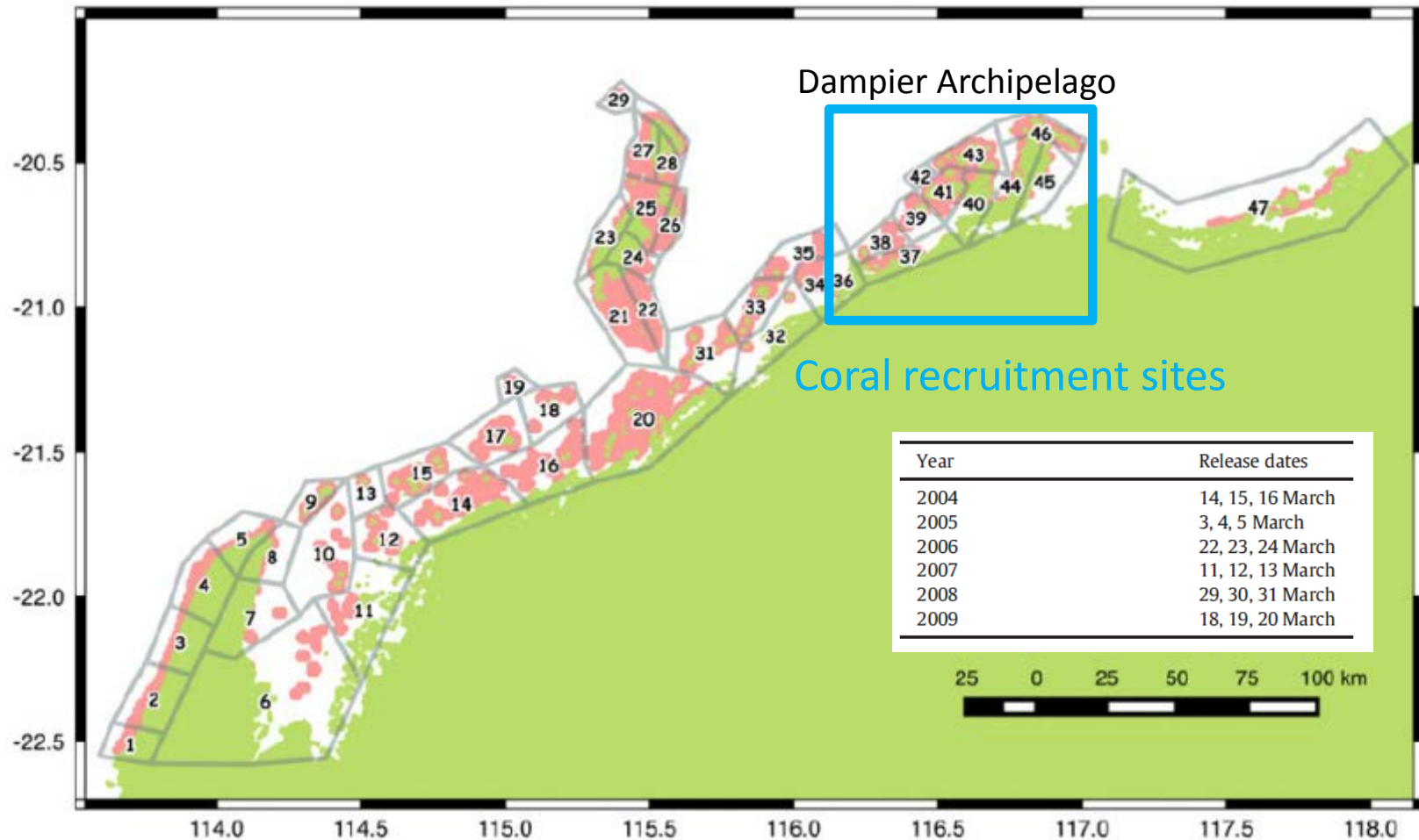
1000+ colonies from 115 spp. = 50% known coral species.

Larval dispersal model

Larval Dispersal Model *Feng et al. 2016*

Dampier Archipelago

Coral recruitment sites

Year	Release dates
2004	14, 15, 16 March
2005	3, 4, 5 March
2006	22, 23, 24 March
2007	11, 12, 13 March
2008	29, 30, 31 March
2009	18, 19, 20 March

Larval dispersal model

The timing of the spawning in March largely determines the direction of larval dispersal (Feng *et al*. 2016)
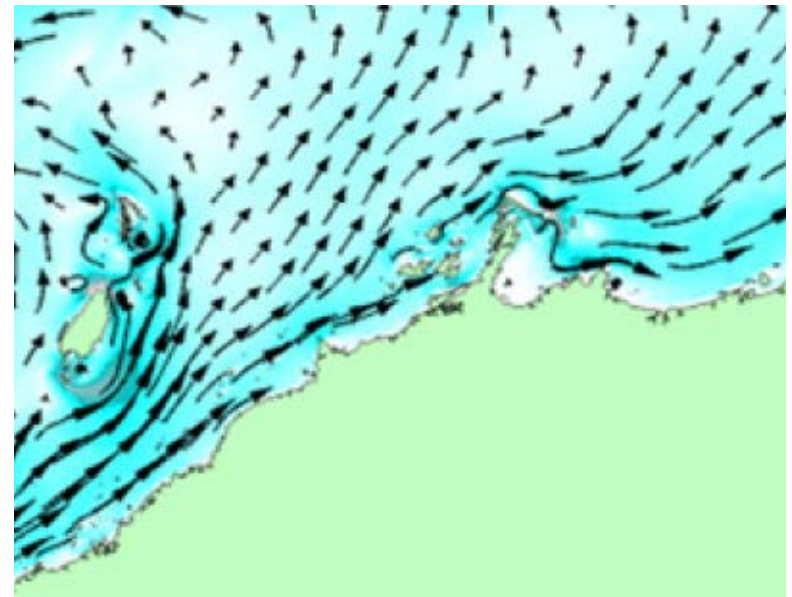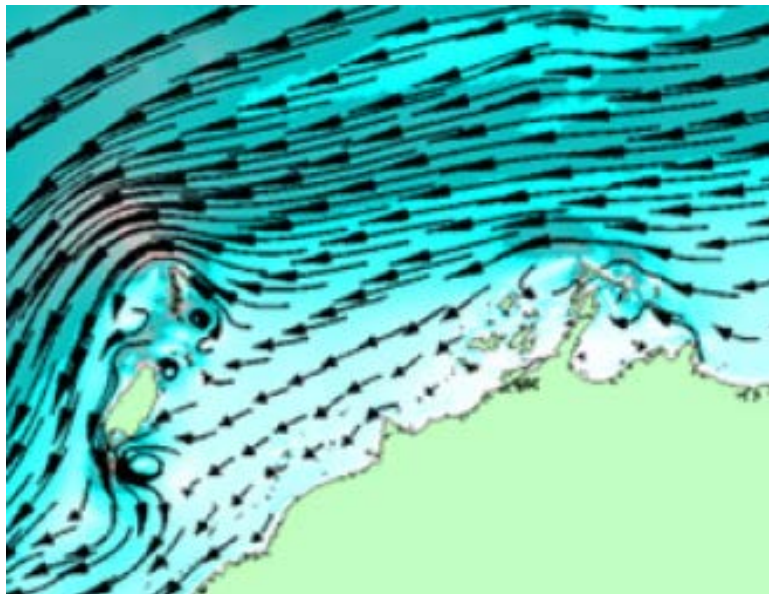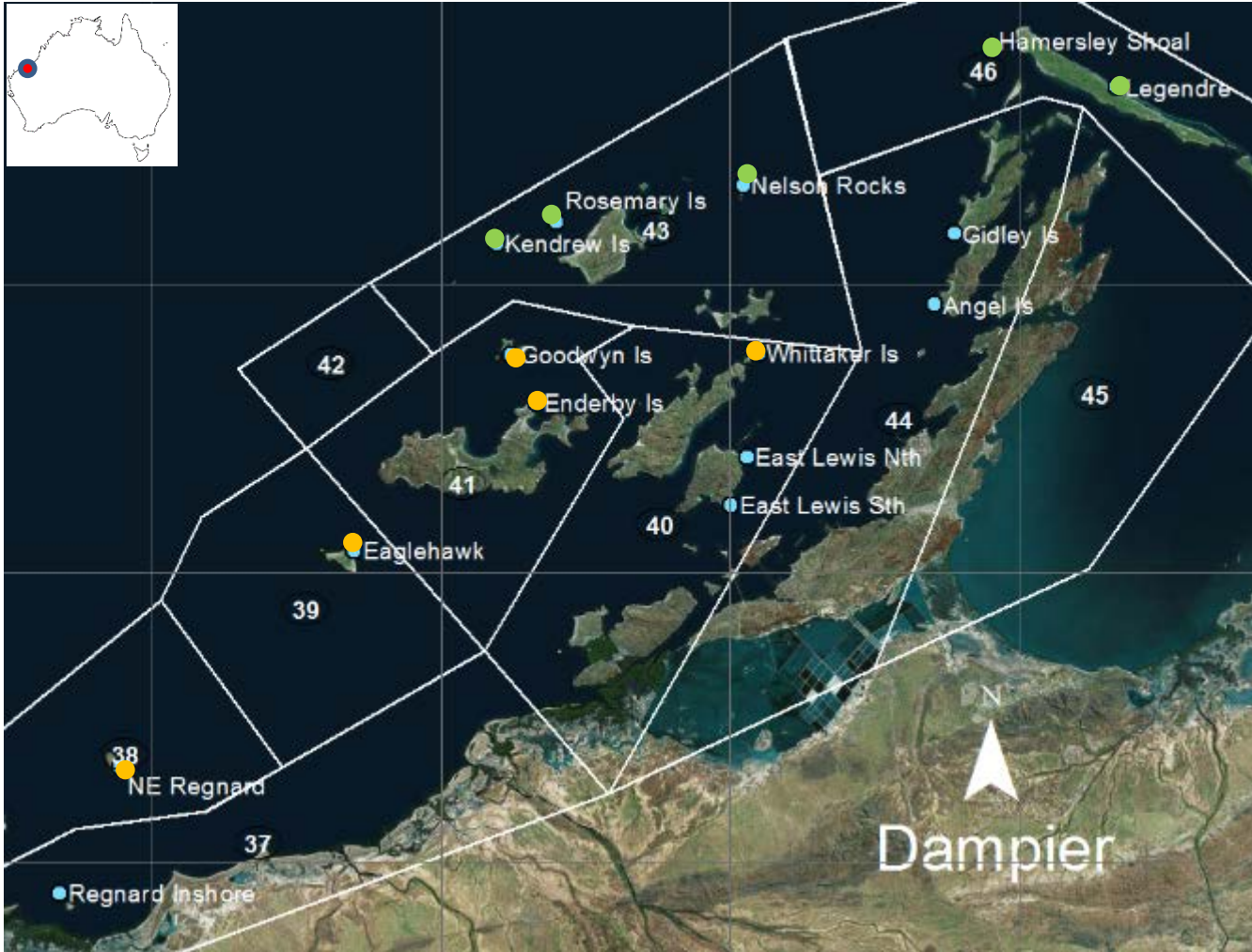
Objectives

- Observed patterns of recruitment at Dampier
- Did the observed recruitment match predicted recruitment
- Important environmental influences

Need to "develop and apply" ecological models

Observed patterns of recruitment

15 sites

INSHORE	LOW	East Lewis Nth
INSHORE	LOW	Regnard Inshore
INSHORE	MID	Gidley Is
INSHORE	HIGH	East Lewis Sth
INSHORE	HIGH	NE Regnard
MIDSHORE	LOW	Goodwyn Is
MIDSHORE	MID	Angel Is
MIDSHORE	MID	Whittaker Is
MIDSHORE	HIGH	Enderby Is
MIDSHORE	HIGH	Eaglehawk
OFFSHORE	LOW	Kendrew Is
OFFSHORE	LOW	Rosemary Is
OFFSHORE	MID/HIGH	Nelson Rocks
OFFSHORE	MID	Legendre
OFFSHORE	HIGH	Hamersley Shoal

3 x groups of 5 tiles
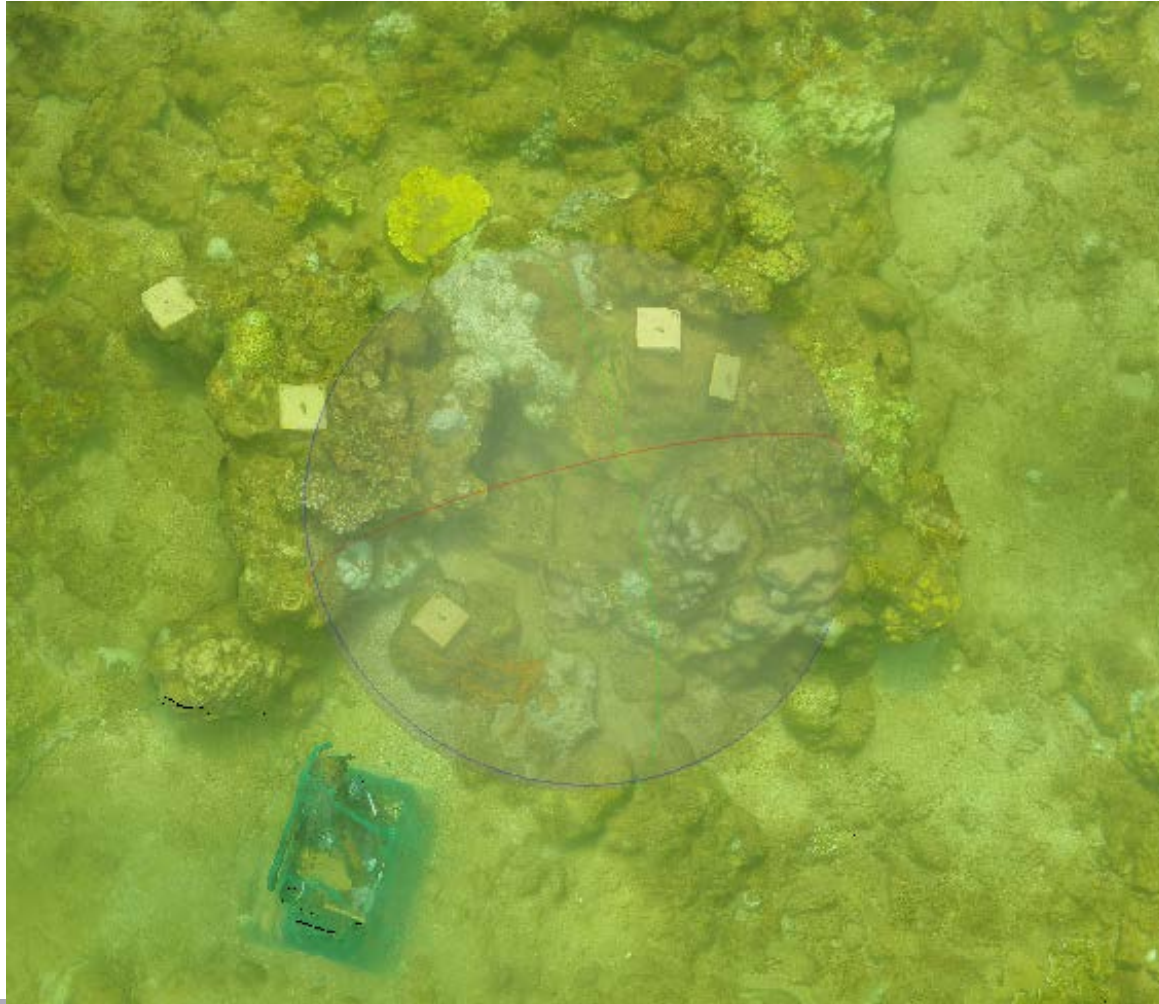
Observed patterns of recruitment

- Tiles attached to substrate
- Settling larvae counted and identified

0.2mm

3cm
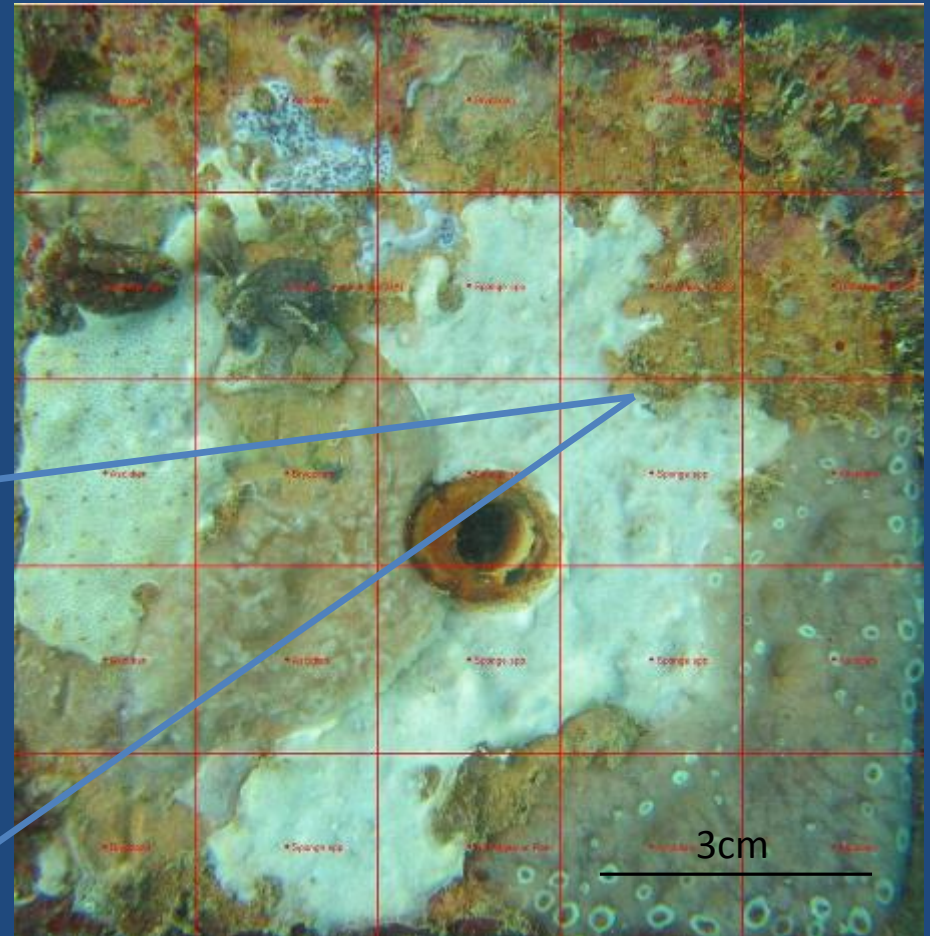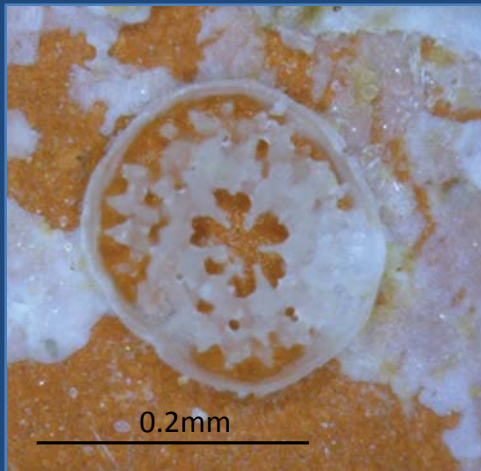
Observed patterns of recruitment

Sub-region (10's km) + Cross – shelf (10's km)

$\downarrow$

Prediction (low, med, high)

$\downarrow$

Site (km's)

$\downarrow$

3 x tile clusters (m's)

Observed patterns of recruitment
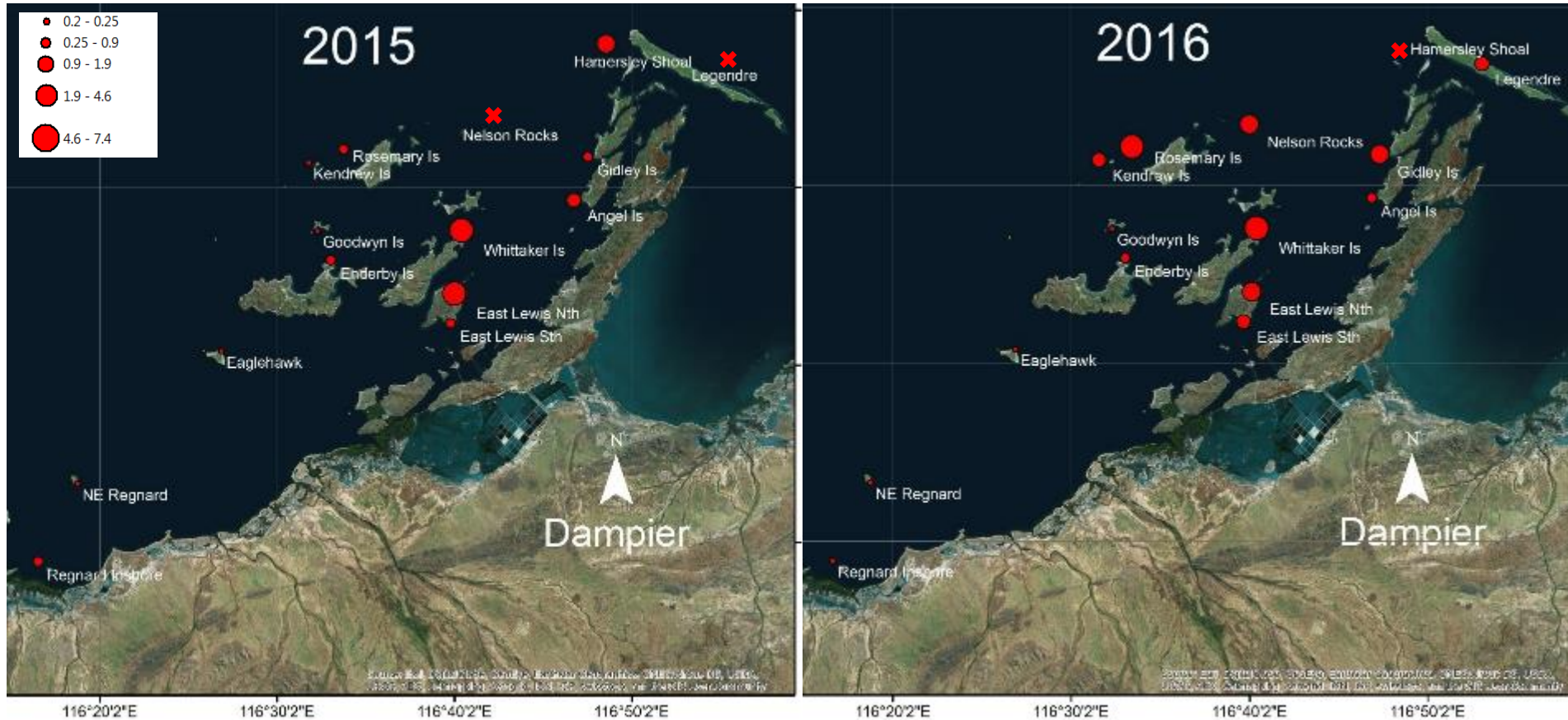
Observed patterns of recruitment

Observed patterns of recruitment

Central Pilbara ≈ 0.5 *(Evans 2015)*
Ningaloo 0.8 ≈ *(Doropolous 2016)*
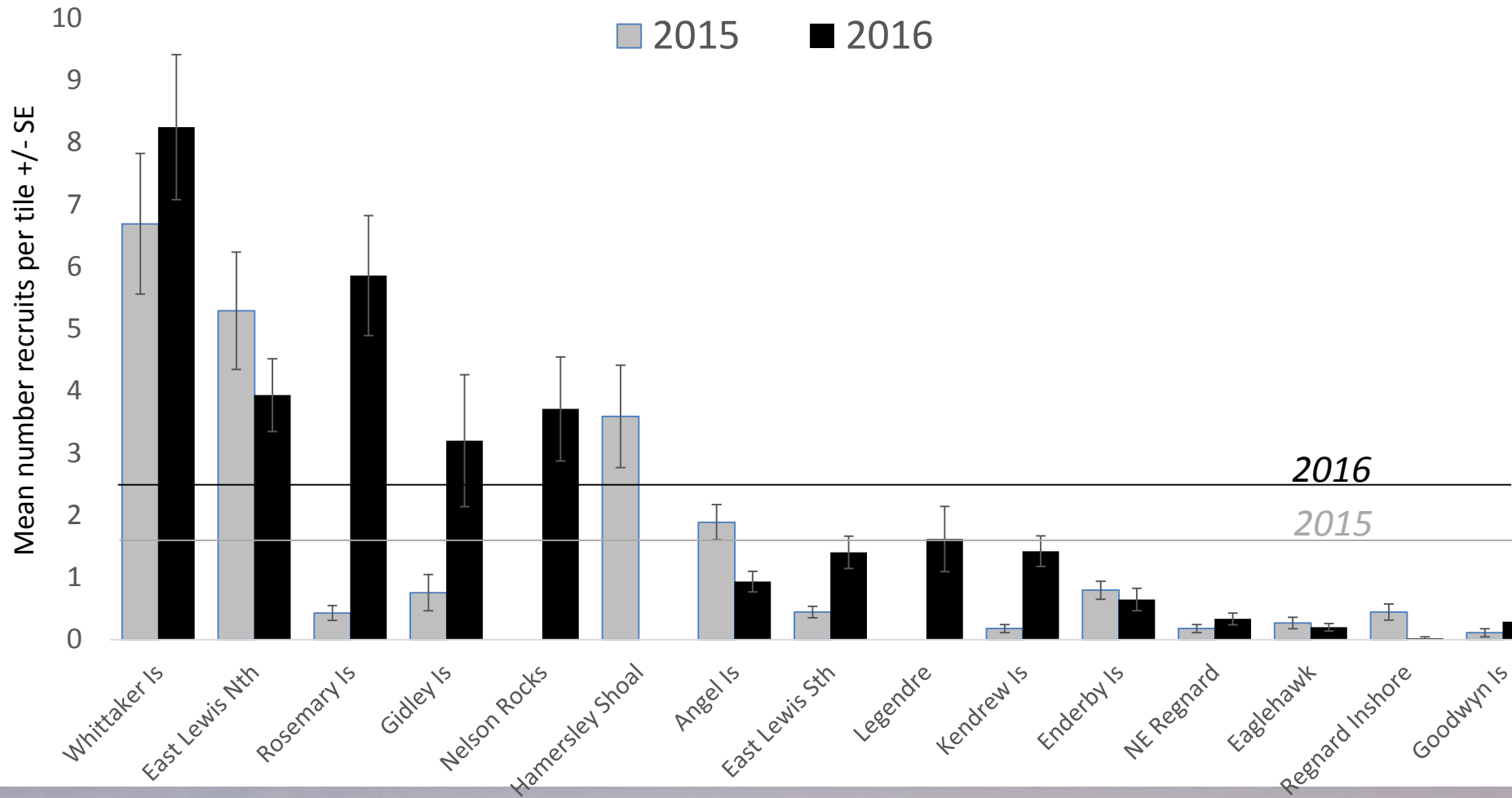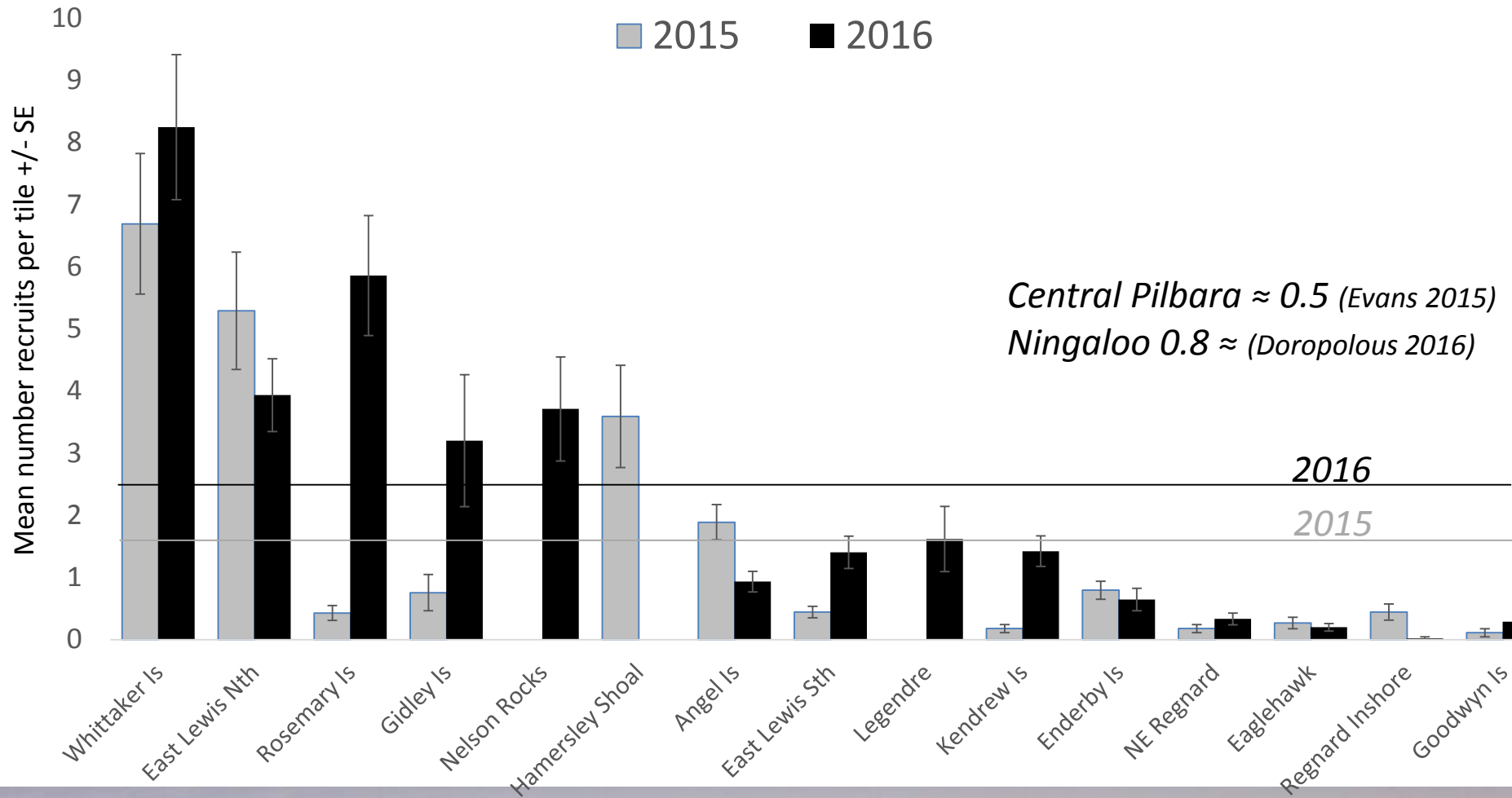
Observed patterns of recruitment

- 50% higher in 2016 than 2015
- Both years higher than regions to the south

Predicted versus observed recruitment

2015

2016

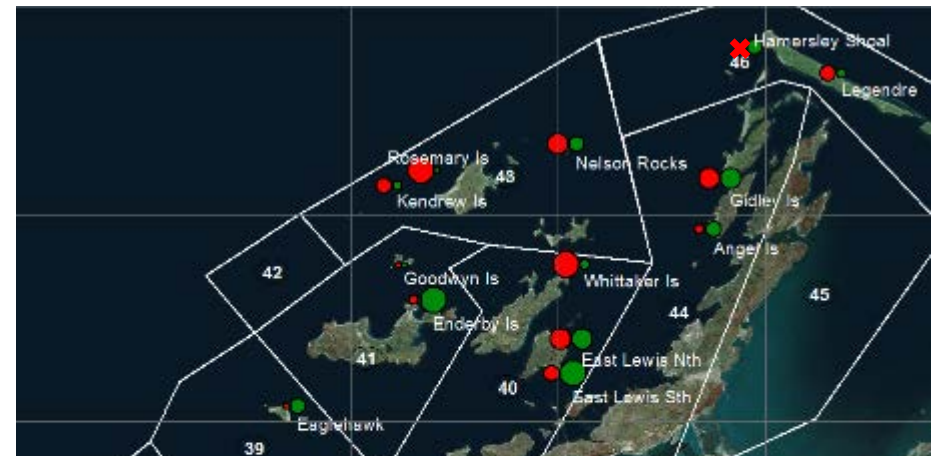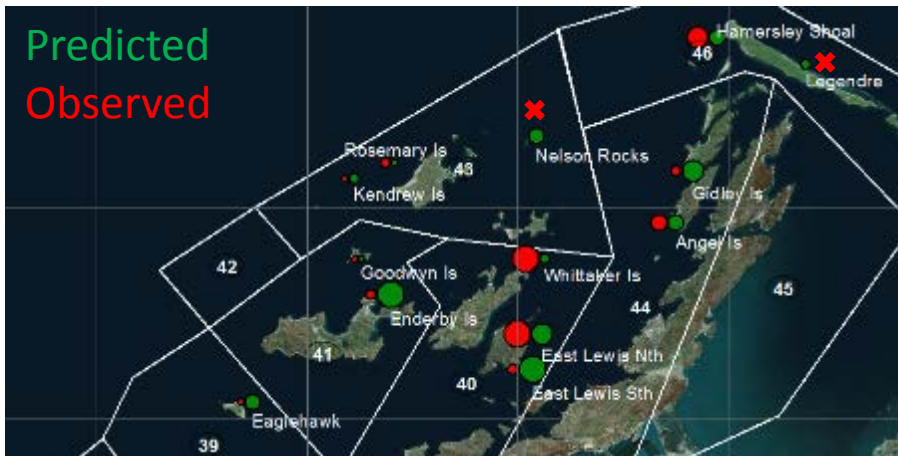# Predicted versus observed recruitment

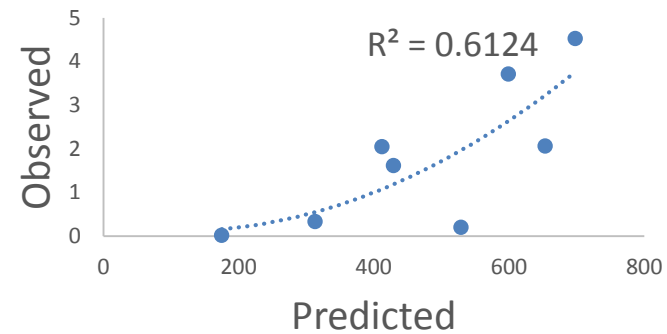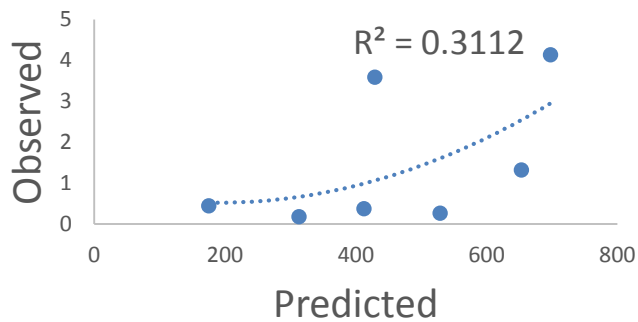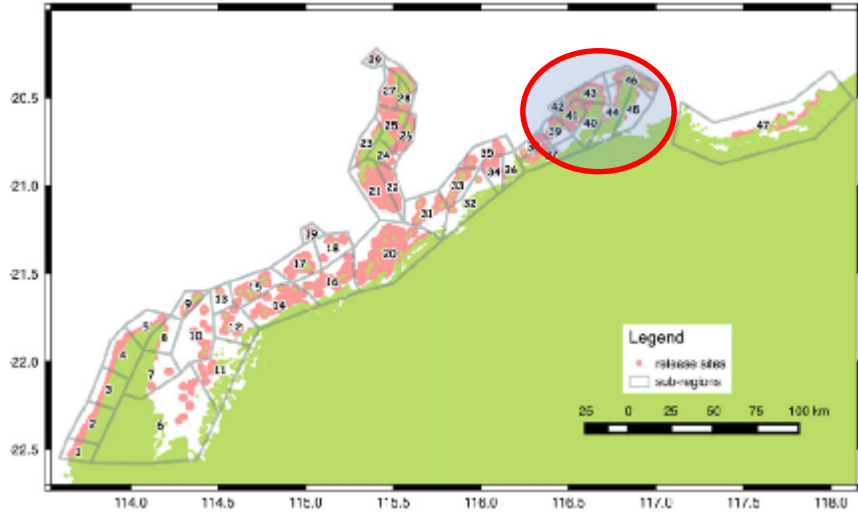2015

2016

Predicted versus observed recruitment

- Weak relationship between predicted and observed recruitment at scale of sites
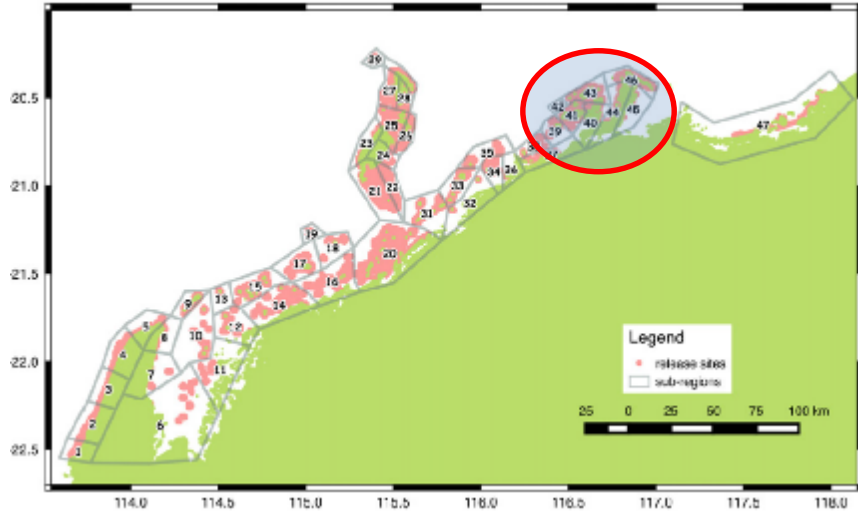- Stronger relationship at the scale of sub-regions
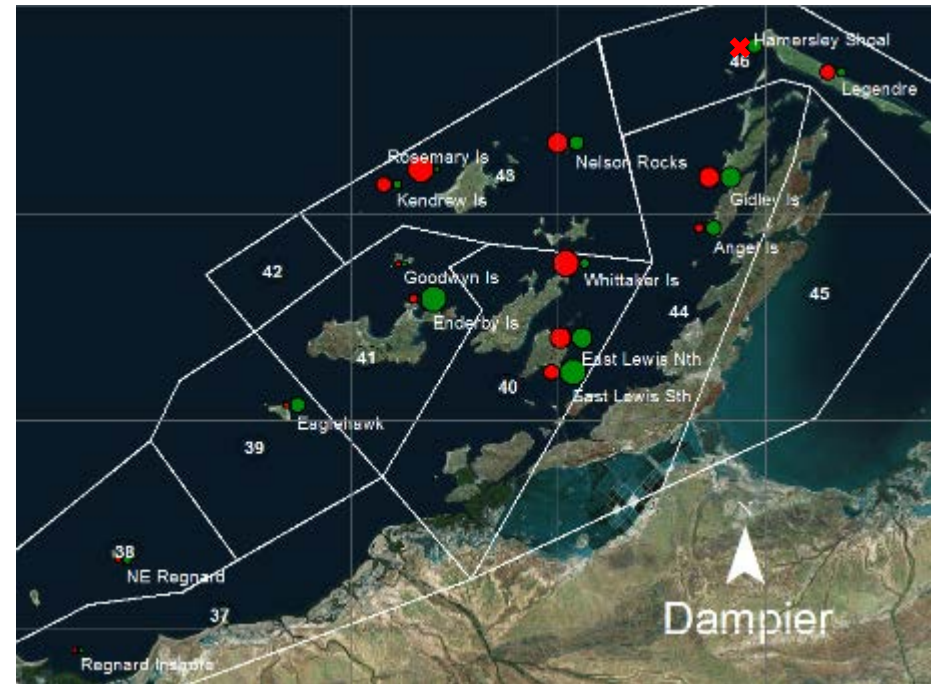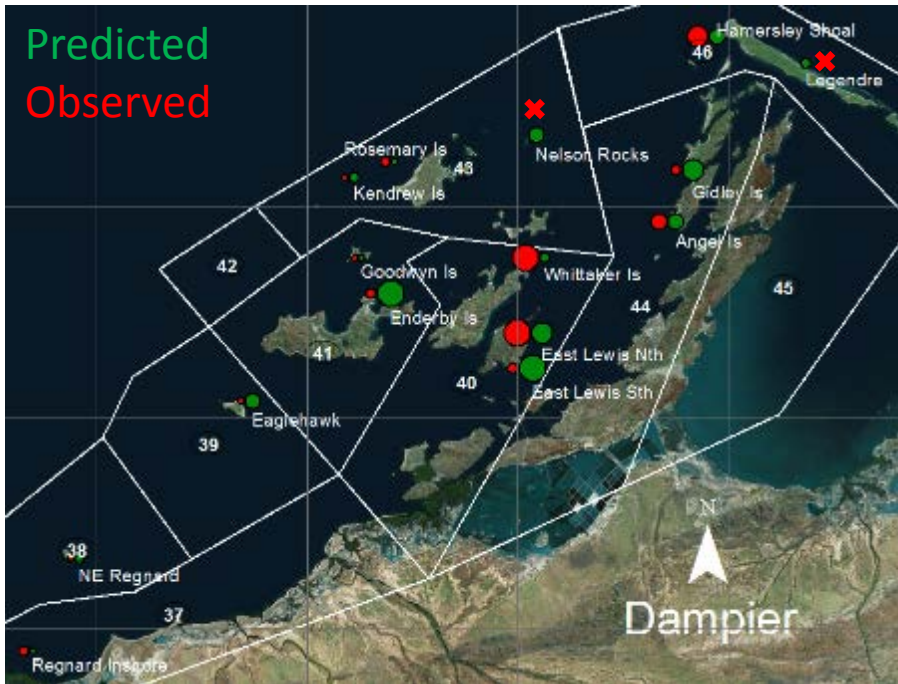
Predicted versus observed

Predicted versus observed
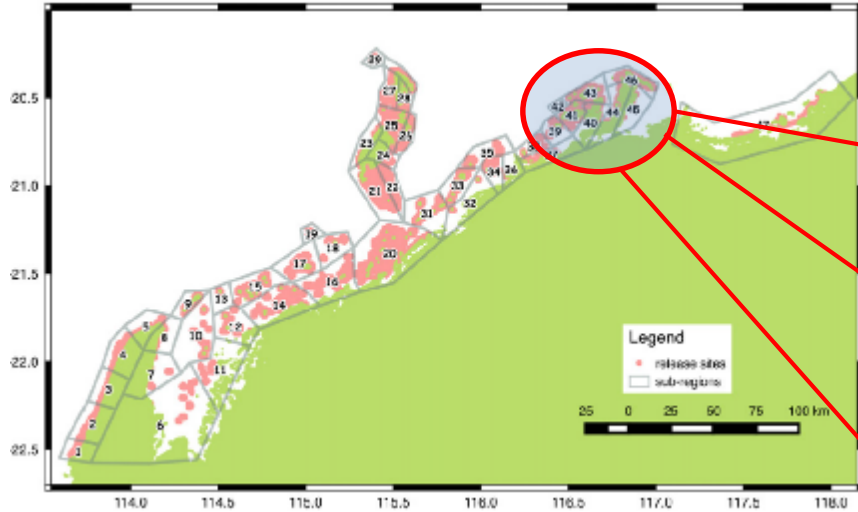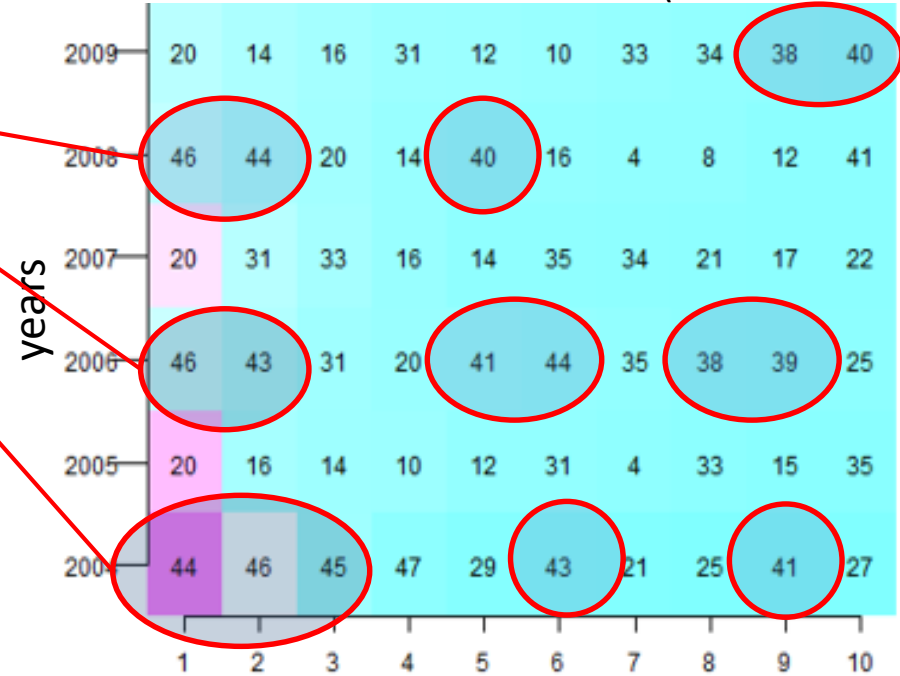

Larvae accumulation matrix (Boshetti *et al*.)

Top 10 model sub-regions

Predicted versus observed

Larvae accumulation matrix (Boshetti *et al*.)

Top 10 model sub-regions

Predicted versus observed

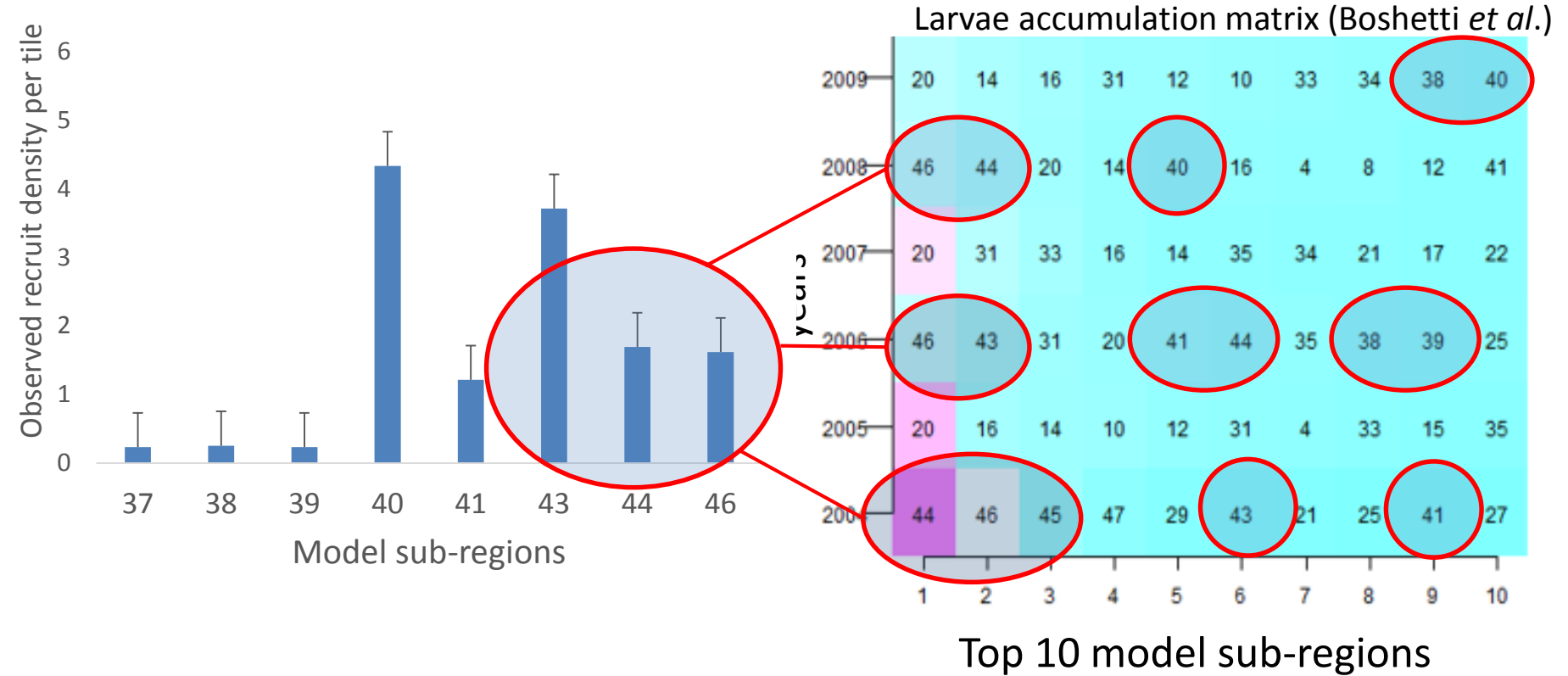Larvae accumulation matrix (Boshetti *et al*.)

Observed recruit density per tile

Model sub-regions

Top 10 model sub-regions

Conclusions

- Recruitment 50% higher in 2016 than 2015

- Recruitment higher than regions to the south

- Dampier sub-regions 46, 43 and 44 important in alternate years Rosemary Is., Kendrew Is., Nelson Rcks, Hammersley, Legendre Is., Gidley Is, Angel Is

Thankyou from the team

Nick Mortimer