NERP Project 6.3

National Environmental Research Program

Critical seabird foraging locations and trophic relationships for the GBR

Brief project description and key findings

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Project 6.3 – Aims

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Effective management of seabird populations on the GBR requires detailed information on foraging areas, resource use and the links between these factors and oceanographic variation.

Without this information it is not possible to identify or manage anthropogenic threats to seabirds that occur outside of nesting colonies.

This study mapped core foraging areas for southern GBR breeding seabirds at multiple spatial scales over a three-year period and is quantifying oceanographic links to foraging site use and prey availability.

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Chick provisioning resources

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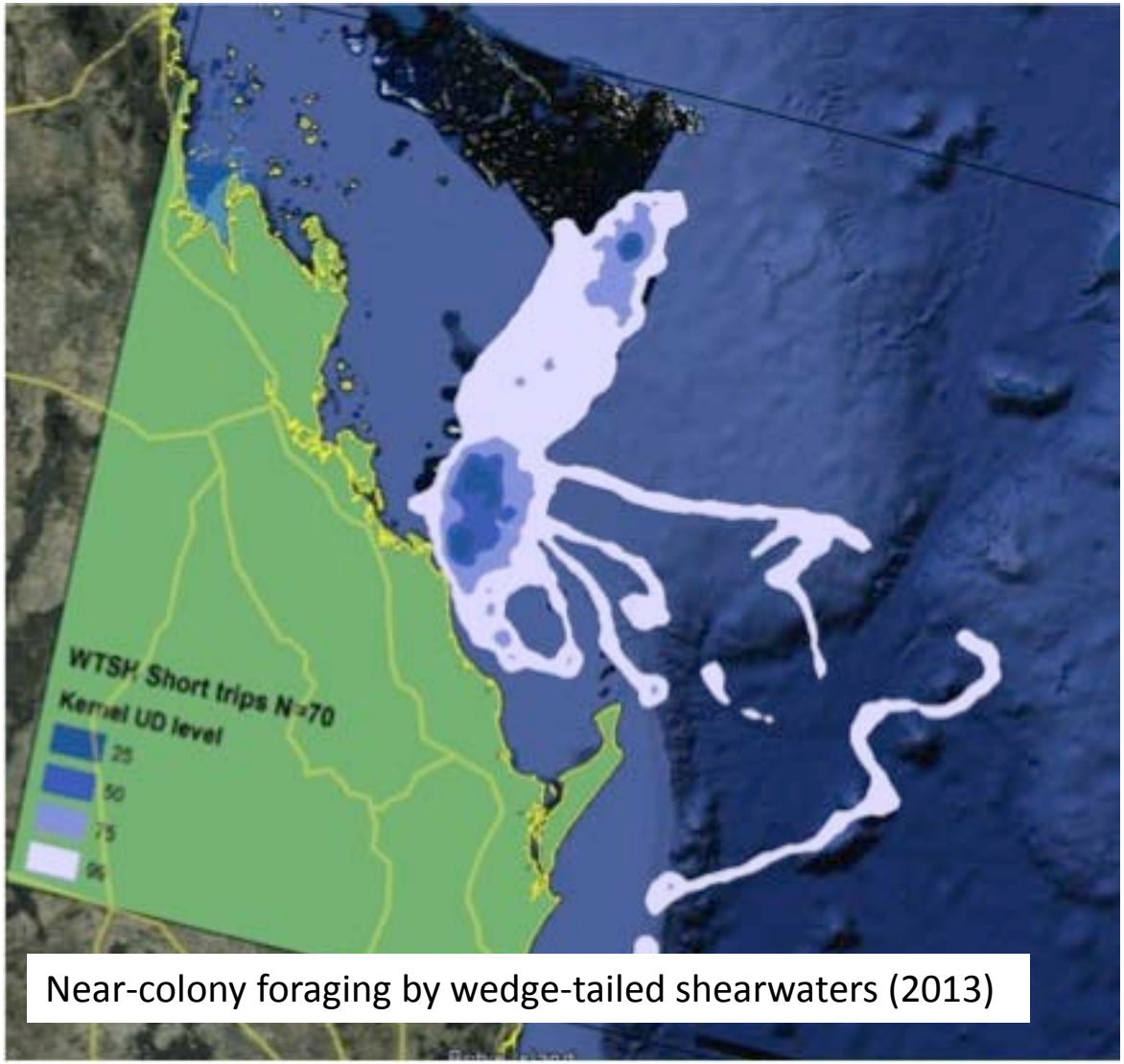

Near-colony foraging by wedge-tailed shearwaters (2013)

When provisioning chicks, adults of multiple species are restricted to near-colony foraging grounds (<200km).

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Adult foraging resources

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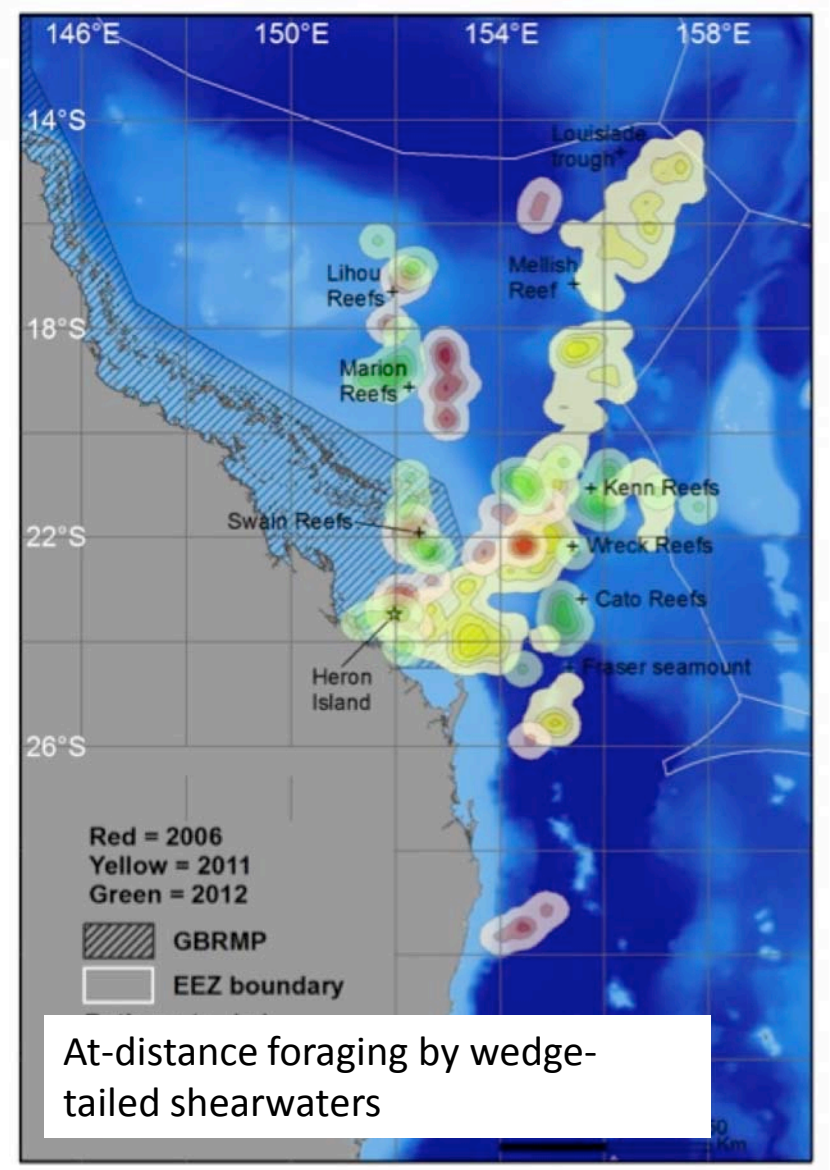

At-distance foraging by wedge-tailed shearwaters

On longer self-provisioning trips adults of some species routinely travel up 1000km to distant foraging grounds in the Coral and Tasman Seas.

Most of these areas are outside the GBR management zone

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Over-winter foraging resources

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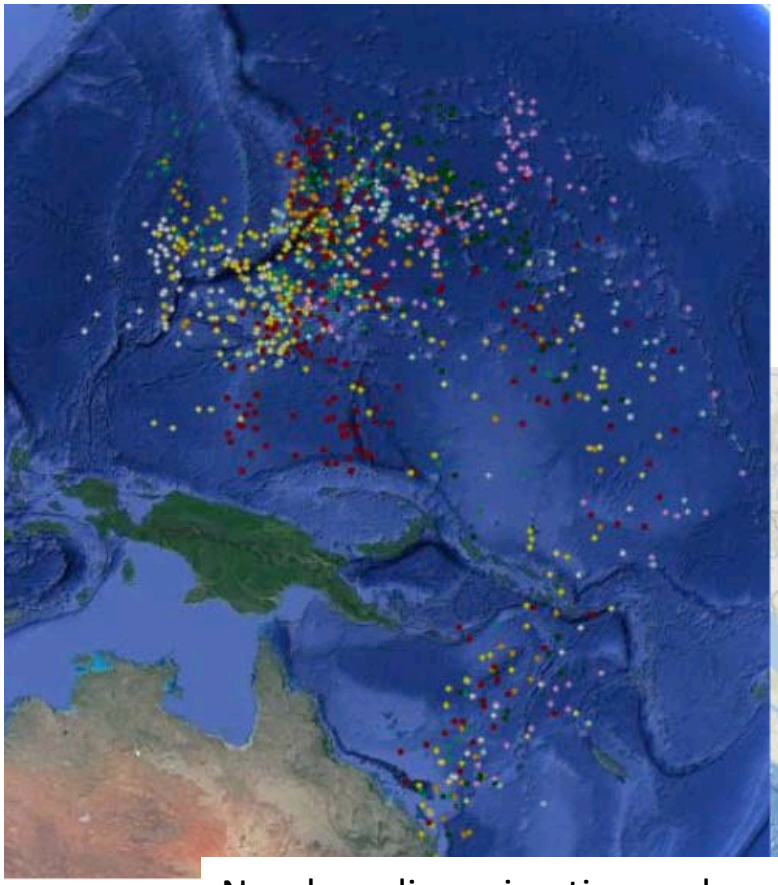
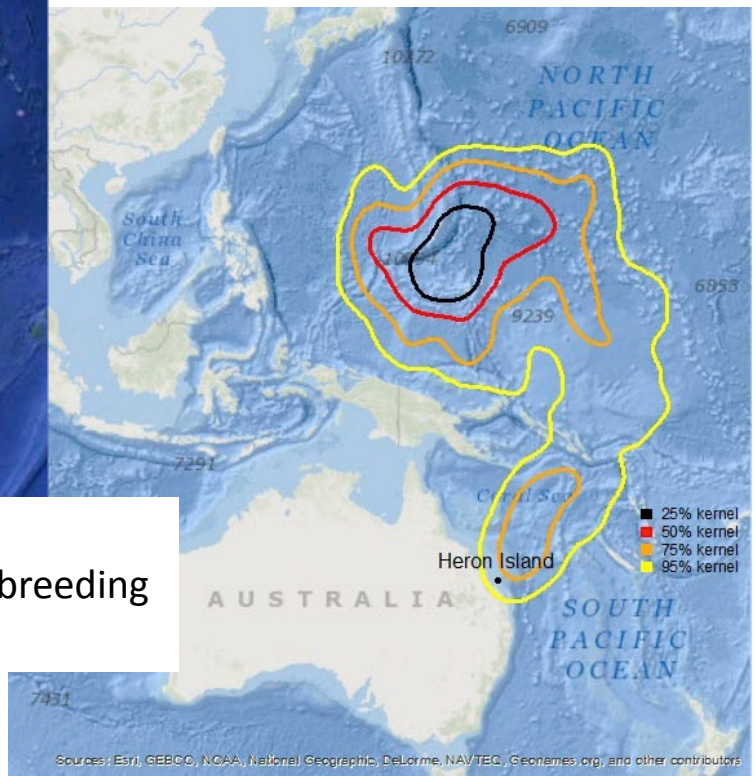


Non-breeding migration and overwintering areas for GBR breeding wedge-tailed shearwaters

When not breeding GBR shearwaters are trans-equatorial migrants that overwinter in Micronesia



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Foraging areas & Oceanography

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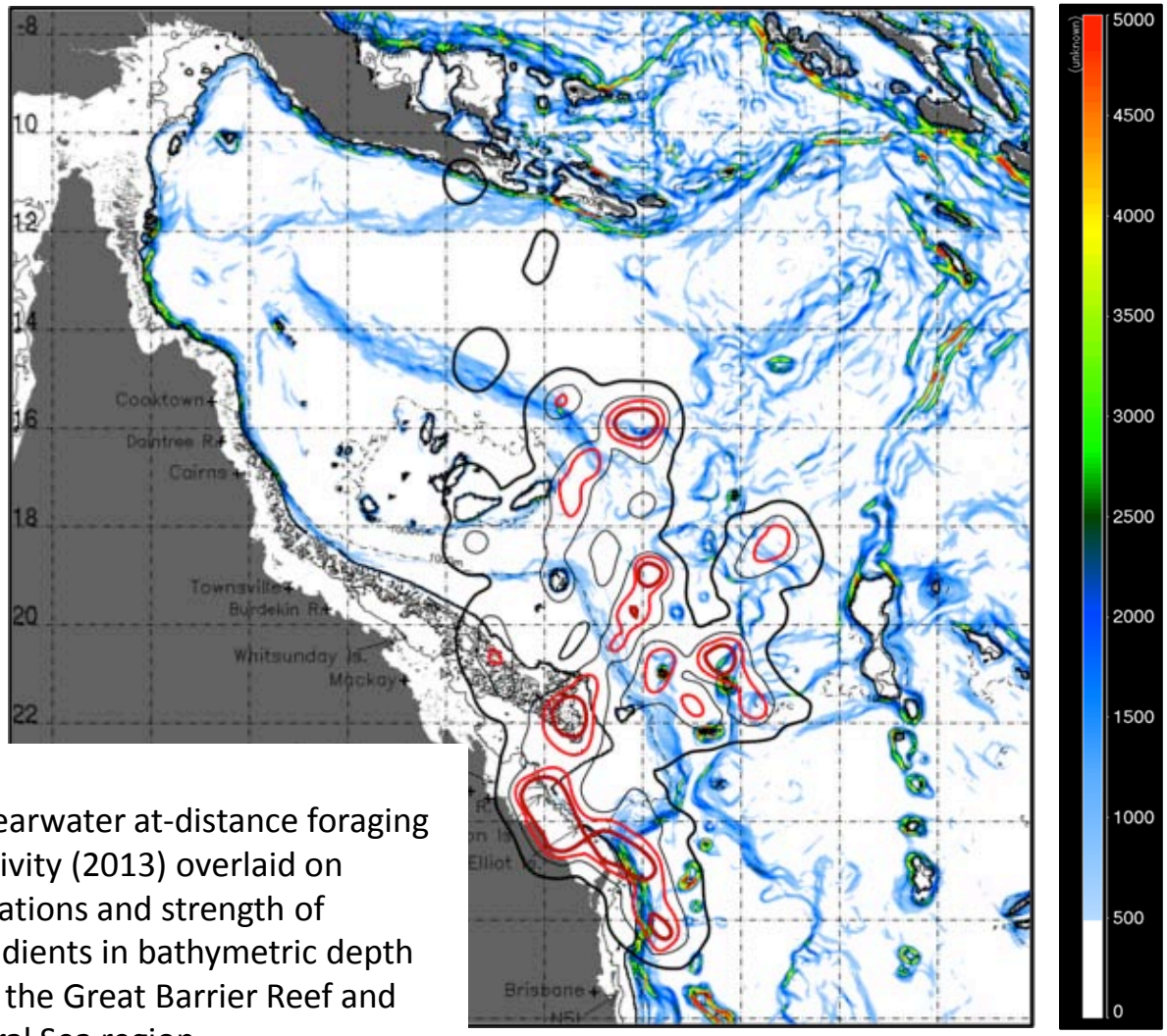

Shearwater at-distance foraging activity (2013) overlaid on locations and strength of gradients in bathymetric depth for the Great Barrier Reef and Coral Sea region.

Foraging success at all sites is linked to local upwelling dynamics driven by steep bathymetric change and large-scale fronts and eddies

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Terrestrial Inputs are important

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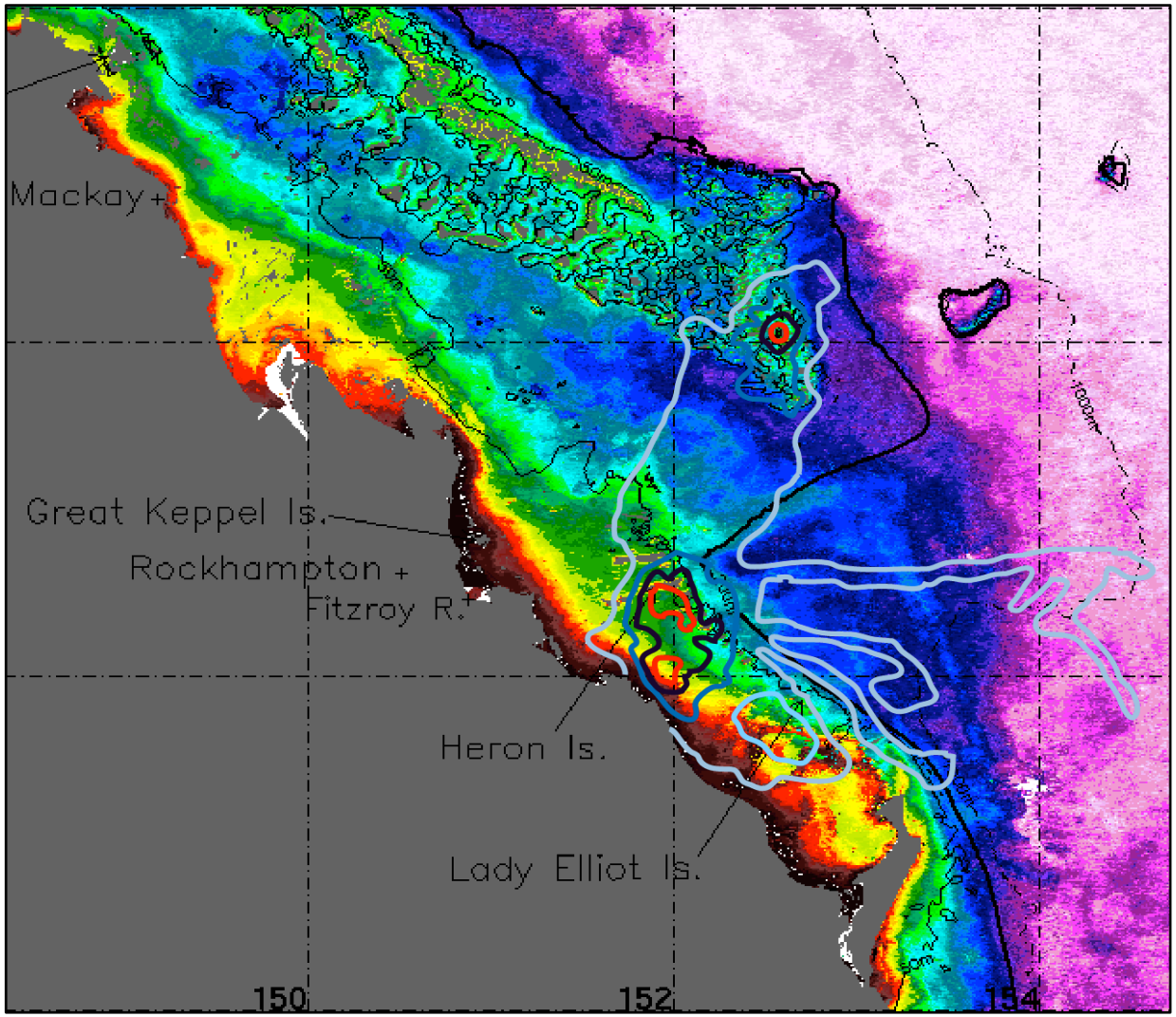

When provisioning chicks foraging activity overlaps significantly with chlorophyll-a signal associated with the flood plume-eddy interactions

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Foraging with Tuna

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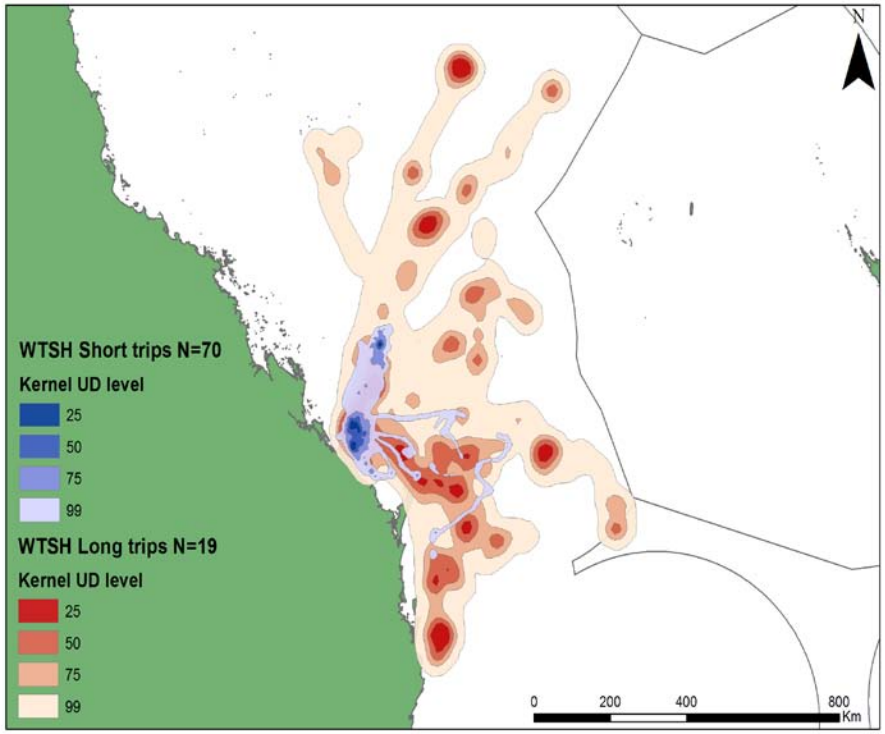

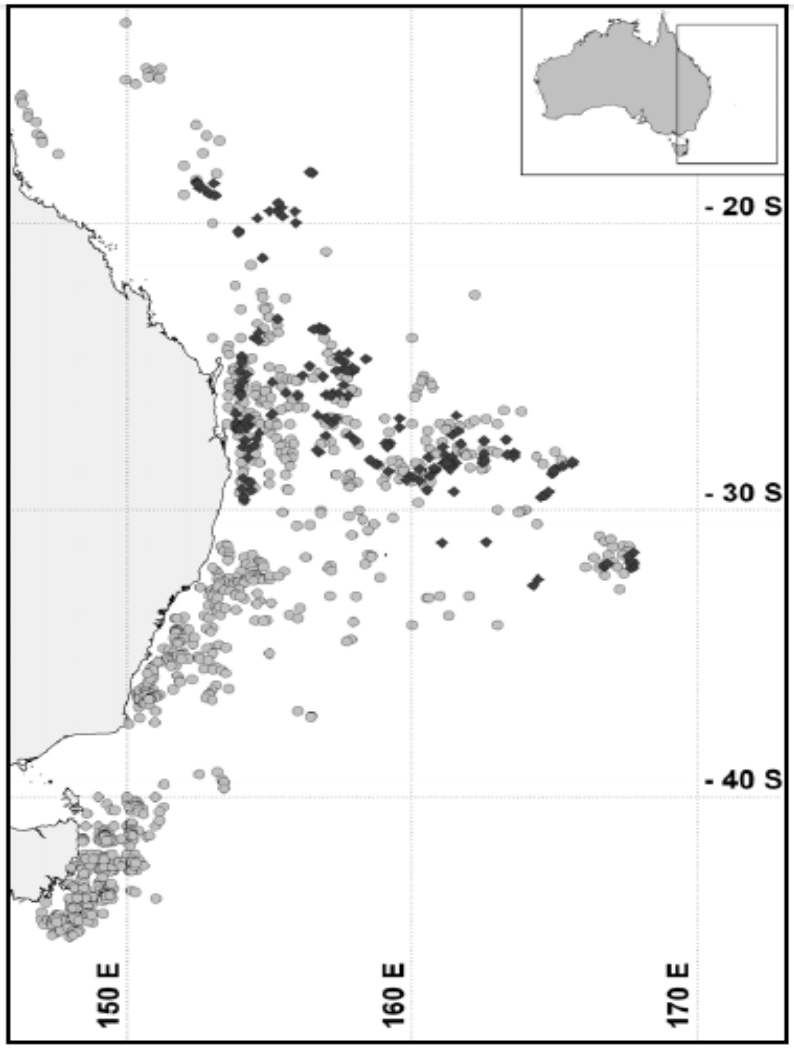

There is significant overlap of at-distance foraging site use with commercial fisheries, outside of GBR management boundaries

Figure 1: Positions of sample collection from longline vessels operating within the Eastern Tuna and Billfish Fishery (ETBF) off eastern Australia. Light shaded dots represent individual fishing days between 1992–2006 rather than specific fish taxa or numbers captured. Dark shaded diamonds represent locations where at least one fish was caught on a hook-timer.

Foraging with Tuna

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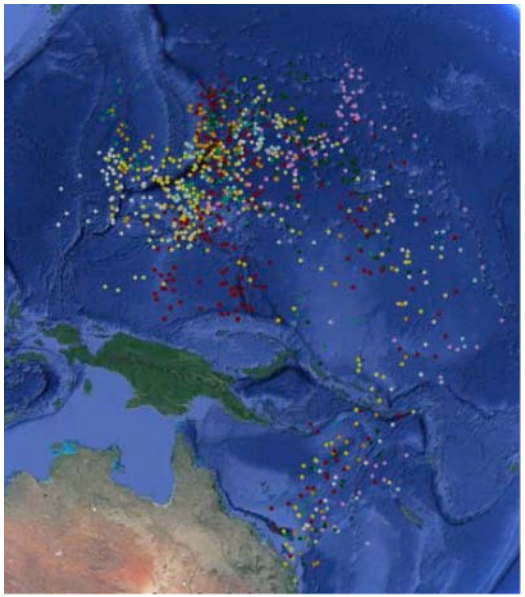
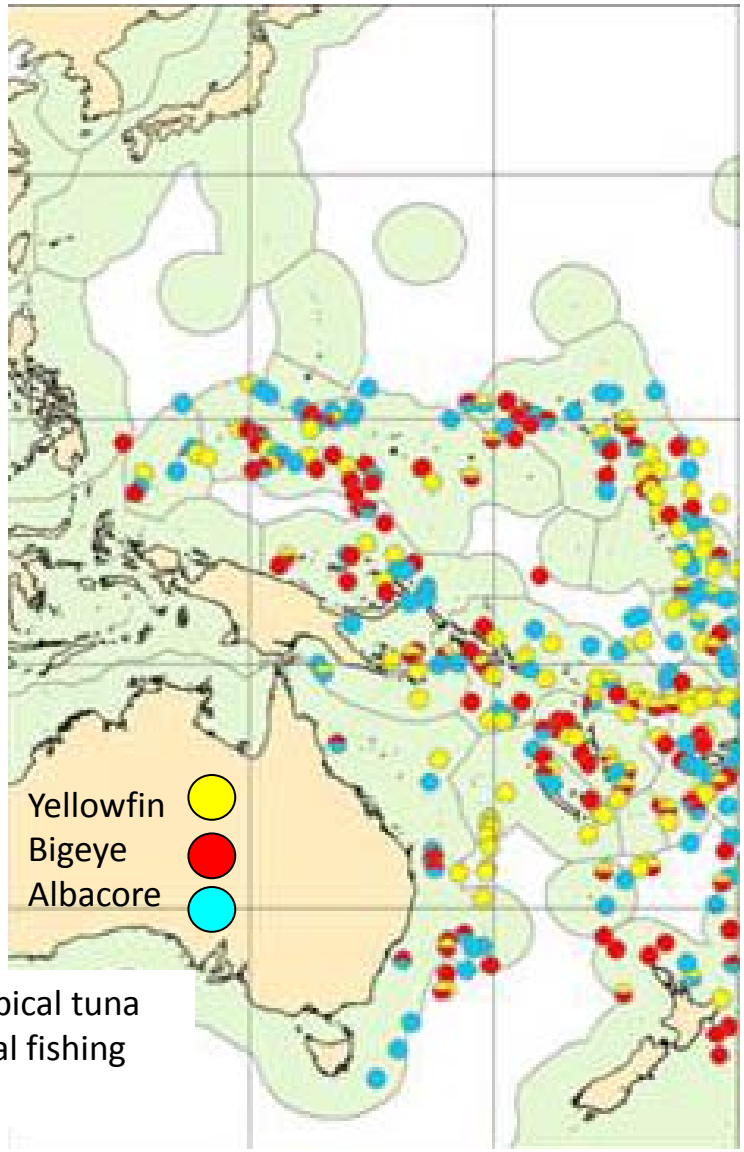
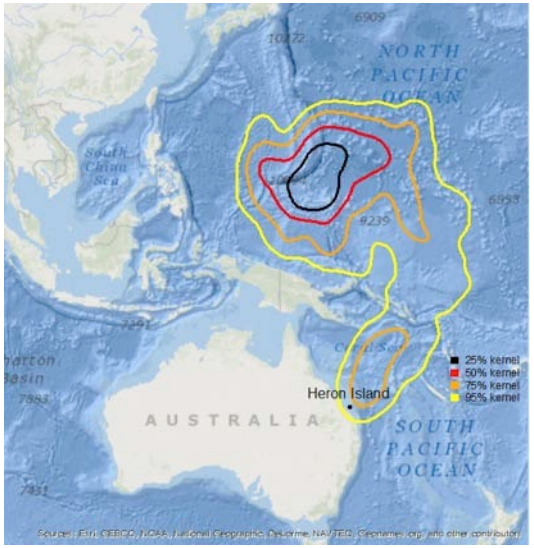




Global tropical tuna commercial fishing 'hot spots'

Overlap with fisheries is also important in non-breeding and pre-breeding foraging locations



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Application to management

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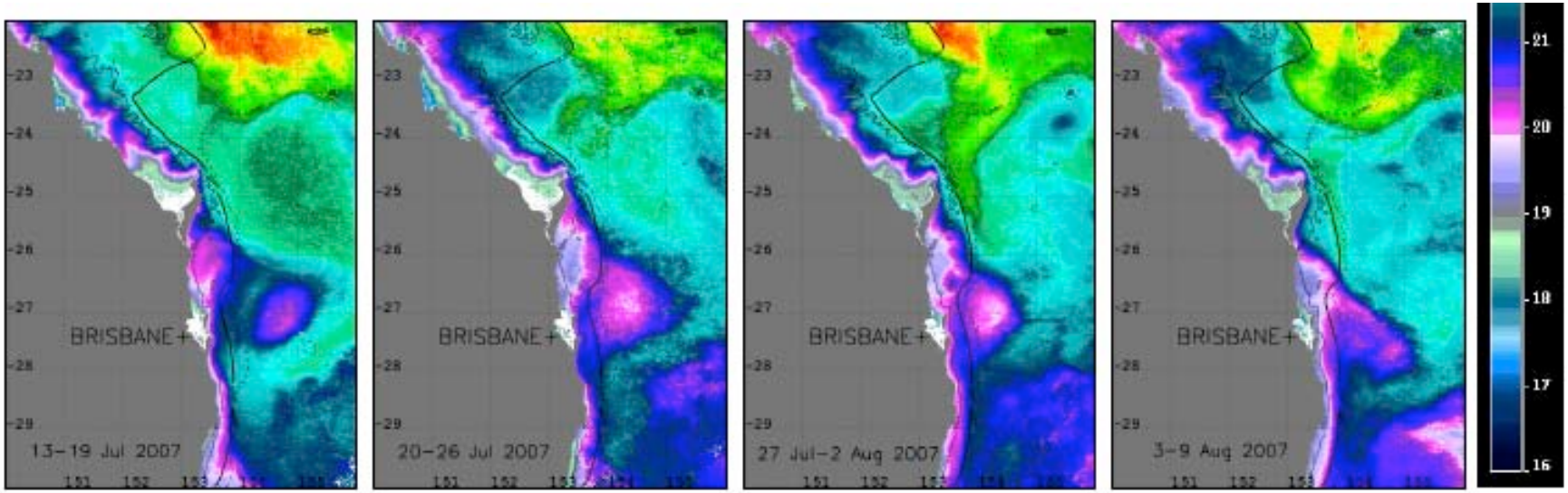
Results provide detailed information on foraging areas, resource use and the links between these factors and oceanographic variation.

This provides managers with substantial new insight into the relative importance of

- specific locations and different factors determining seabird foraging and reproductive success on the GBR and
- whether these locations and factors are adequately considered in current management programs/designs.



Application to management

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Without this information it is not possible to identify, quantify or manage existing or future anthropogenic threats to seabirds that occur outside of nesting colonies

Consequently, these data provide a basis for detecting and predicting how climate variation and/or other anthropogenic stressors such as terrestrial inputs or commercial fishing activity influence seabird breeding success and population viability into the future.

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The cast of thousands

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