Population model assessments of fishing and other anthropogenic impacts on seabird populations

Geoff Tuck

CSIRO Marine and Atmospheric Research

Hobart

Tasmania

Outline

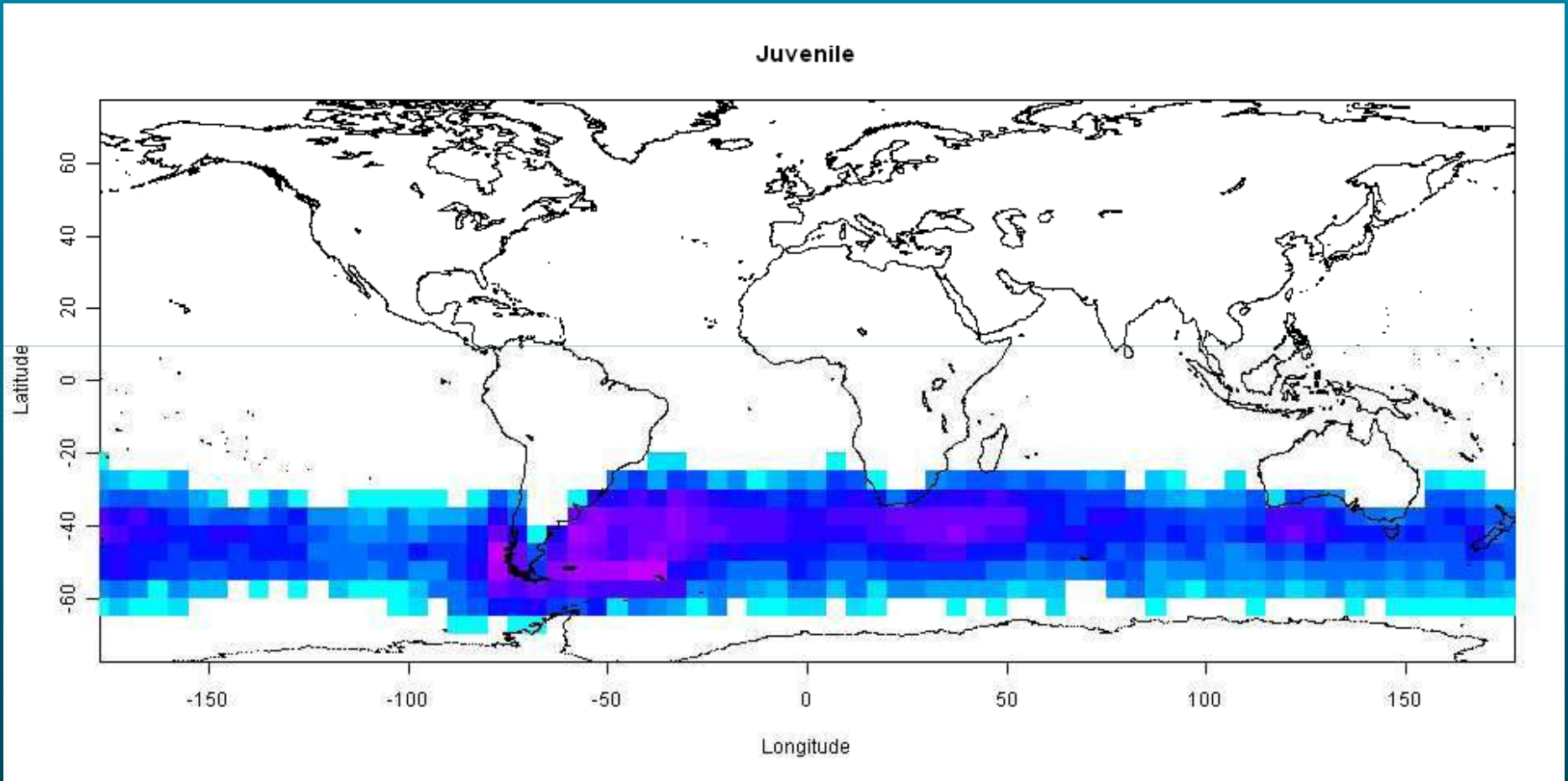
- What's the problem?
- The Atlantic Ocean Seabird Assessment
- The Lord Howe Island Flesh-footed Shearwater Assessment

What's the problem?

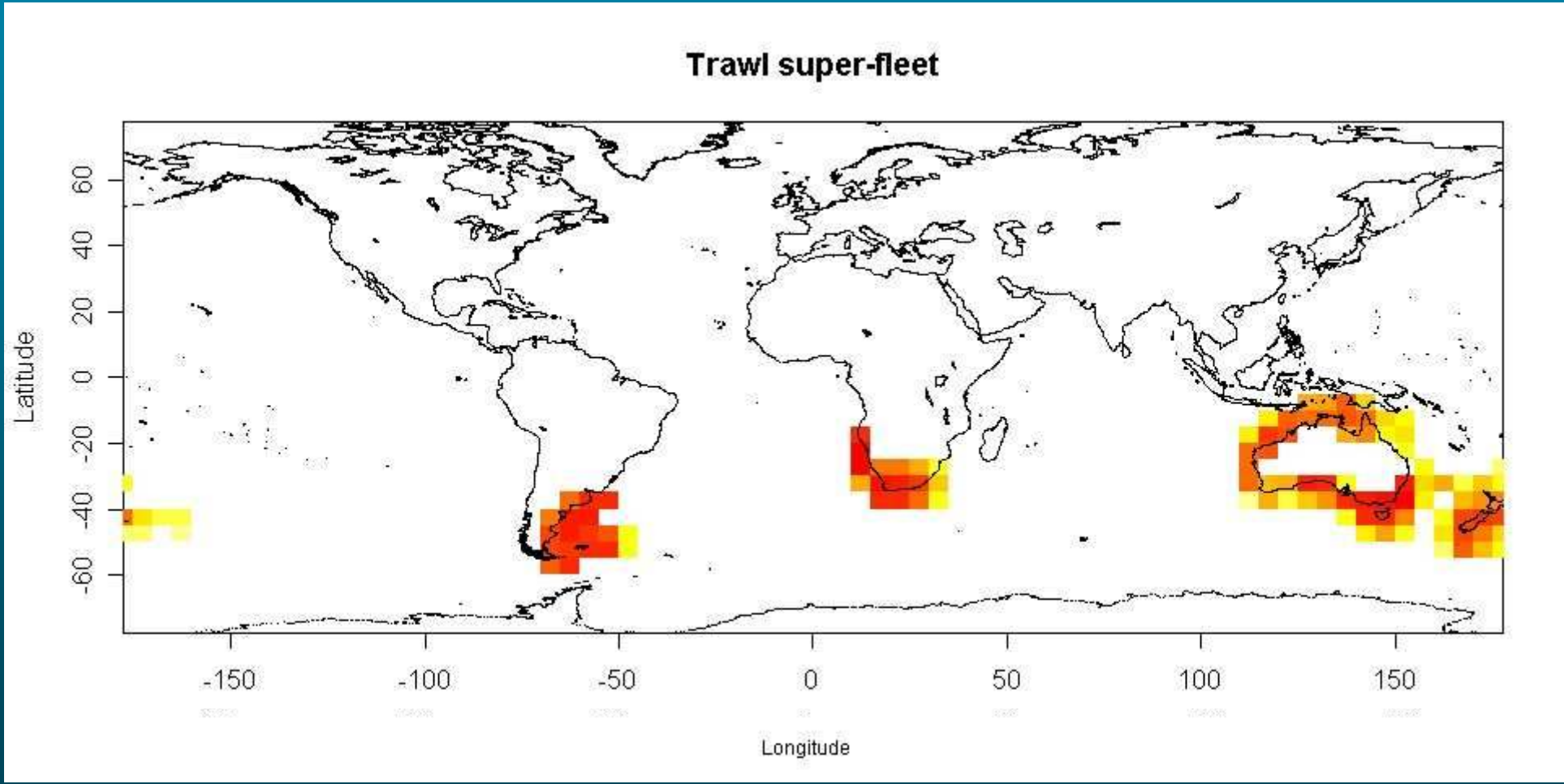
Firstly,

- Many seabirds are long-lived (50 years or more)
- Late age of maturity (albatrosses 10+)
- Low reproductive output (some have at most 1 chick every 2 years)
- Wide ranging (some circumpolar in distribution)
- Opportunistic scavengers
- Good divers (shearwaters to 60m)

Foraging Distribution – juvenile wanderer



Sources of mortality – at sea



Atlantic Ocean Seabird Assessment

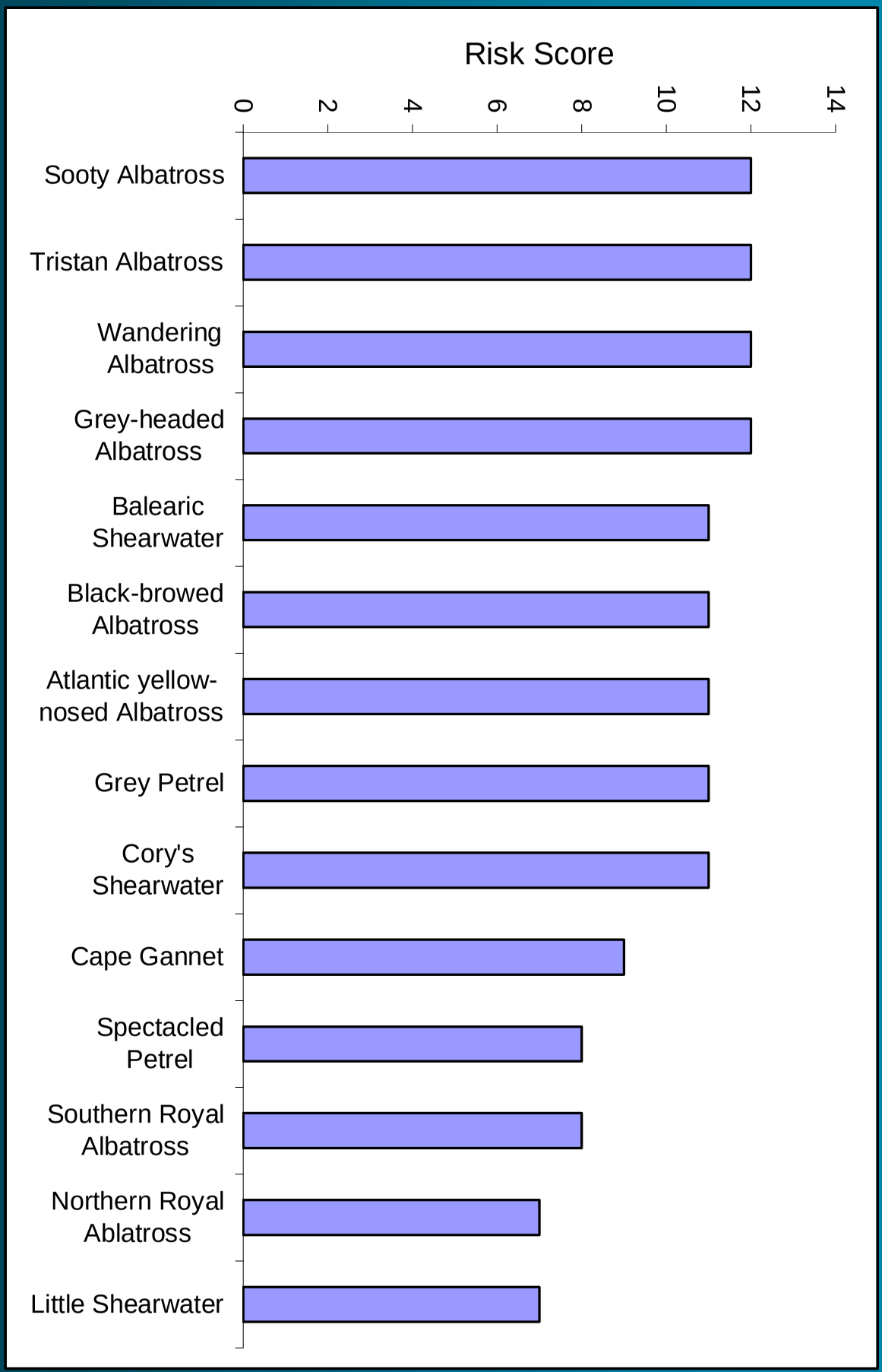
- In 2006 the International Commission for the Conservation of Atlantic Tunas (ICCAT) called for an assessment of the impacts of ICCAT fisheries on all seabirds
- International collaboration between CSIRO, British Antarctic Survey, BirdLife International etc.
- Seabird biologists, Modellers (Thomson, Klaer, Tuck), Fishery Managers, Industry

Atlantic Ocean Seabird Assessment

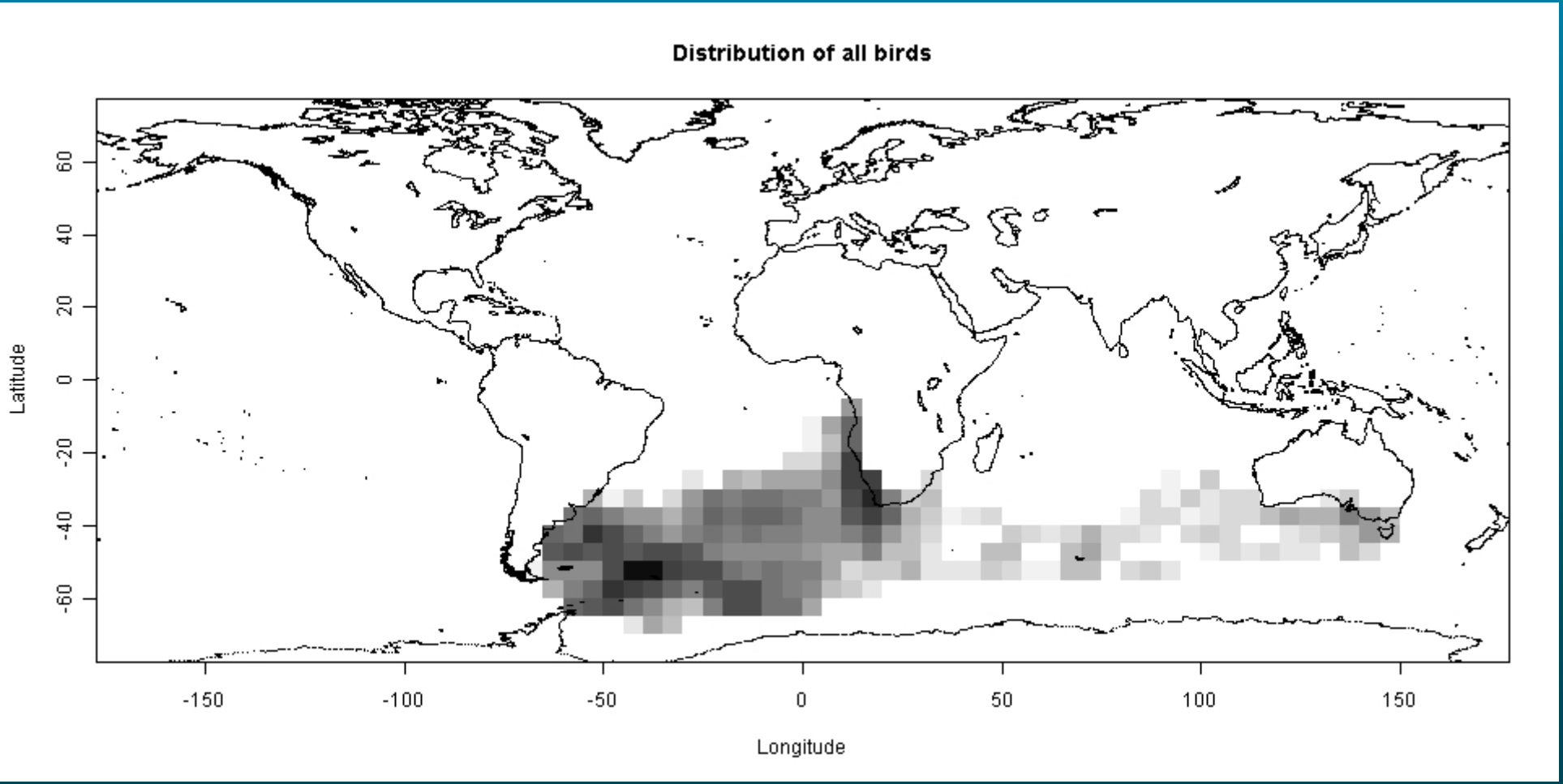
Identified a 6 step process

1. Risk. Identify the seabird species most at risk. Productivity-Susceptibility Analysis (PSA)

- Productivity - #chicks, age at maturity, population size
- Susceptibility – Overlap with fisheries, susceptibility to capture


Risk Score
0
2
4
6
8
10
12
14
Sooty Albatross
Tristan Albatross
Wandering Albatross
Grey-headed Albatross
Balearic Shearwater
Black-browed Albatross
Atlantic yellow-nosed Albatross
Grey Petrel
Cory's Shearwater
Cape Gannet
Spectacled Petrel
Southern Royal Albatross
Northern Royal Ablatross
Little Shearwater

Atlantic Ocean Seabird Assessment



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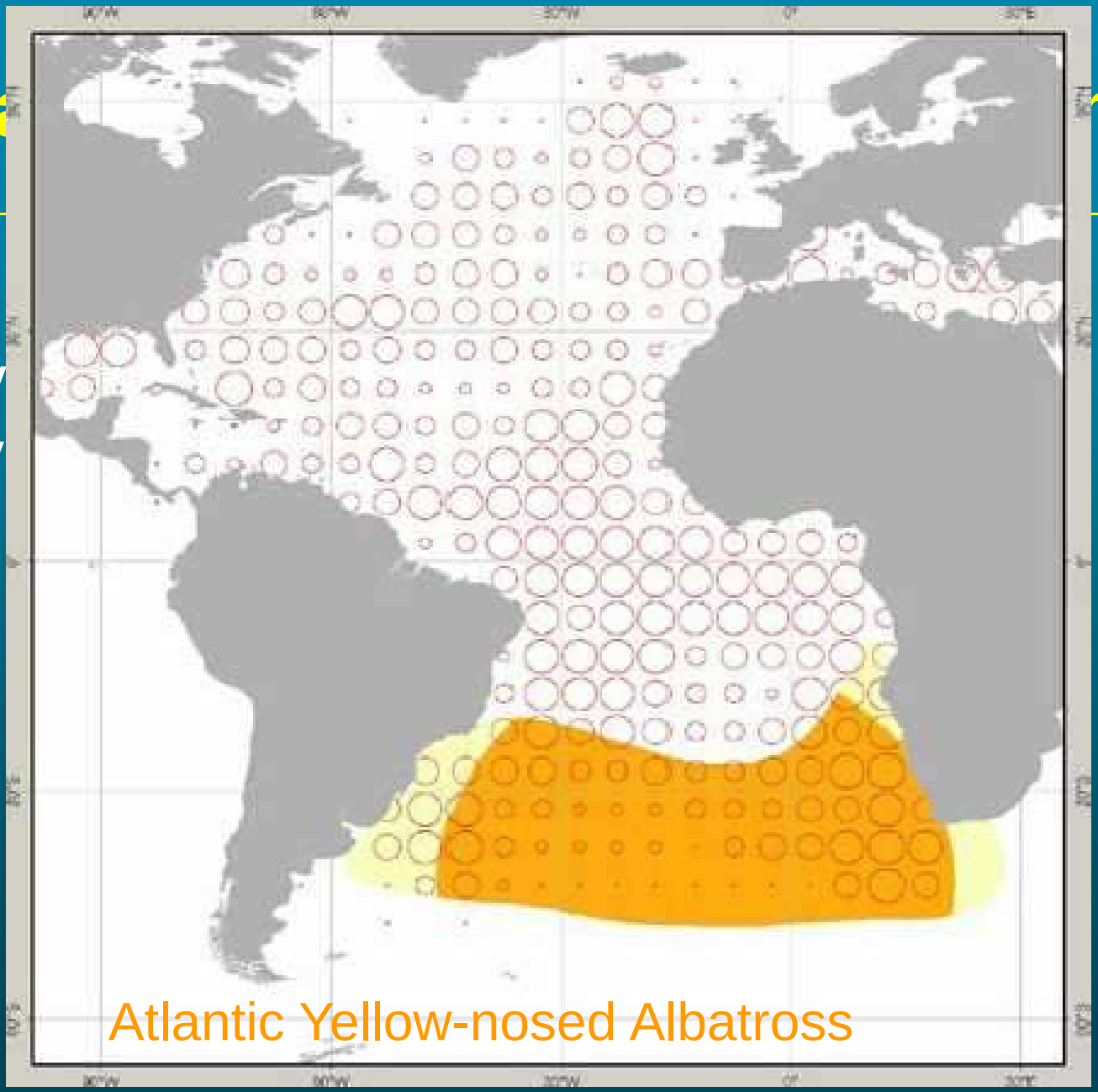


Atlantic Yellow-nosed Albatross

Atlantic Ocean Seabird Assessment

4. Bycatch. Review existing bycatch rate estimates for ICCAT longline fisheries

For example (birds/1000 hks):

Brazil	0.27
South Africa	0.20
Uruguay	0.55
Taiwan	0.03 (believable???)

Atlantic Ocean Seabird Assessment

5. Total Kill. Estimate total annual seabird bycatch in the ICCAT Convention Area

- Multiply bycatch rates by effort to get estimated kill
- Nearly 50,000 birds killed by Atlantic Ocean longliners between 2003 and 2006
- 60% were albatrosses
- Including wandering albatross and the critically endangered Tristan albatross

Atlantic Ocean Seabird Assessment

6. Impact. Assess the likely impact of this bycatch on seabird populations

- Quantitative assessment models were applied to 4 of the 22 high risk populations
- Wandering albatross
- Black browed albatross
- Tristan albatross
- Atlantic yellow-nosed albatross

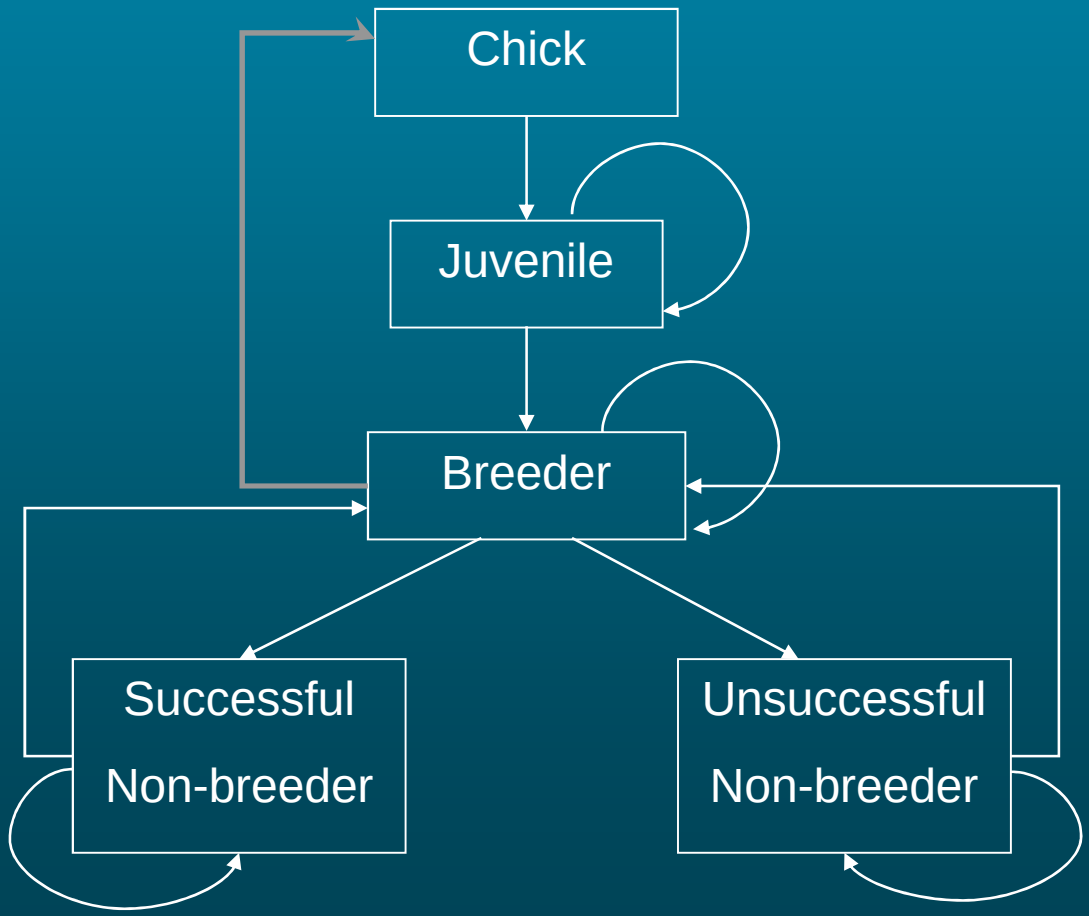
Atlantic Ocean Seabird Assessment

6. Impact (cont.)

- Data – obtain fishing effort data from ALL fleets that may interact with these populations
- Pelagic and demersal longline, trawl, squid jig
- Other sources of mortality (eg mice, human consumption!)
- Set up population model

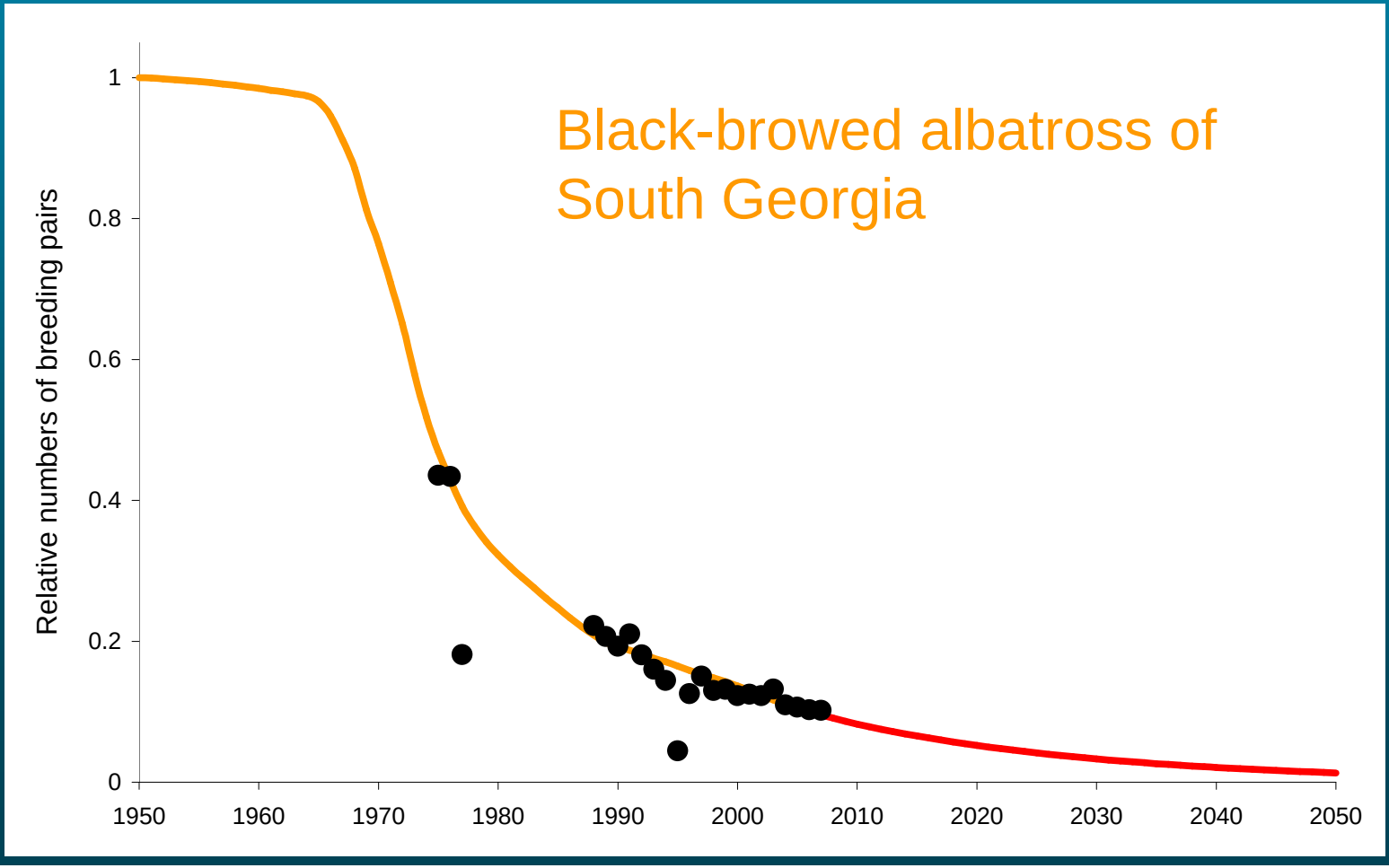
Atlantic Ocean Seabird Assessment

6. Impact (cont.)



Atlantic Ocean Seabird Assessment

6. Impact (cont.)



Atlantic Ocean Seabird Assessment

Main management outcomes recommended by the ICCAT Sub-Committee on Ecosystems:

- Longliners must use (i) bird scaring (tori) lines and (ii) weighted branch lines (throughout the Atlantic Ocean)
- Above applies to swordfish fleets as well as tuna
- Onus is on the fleet to show it is not catching birds
- Increase observer coverage to look at bird interactions
- Further quantitative assessment

Flesh-footed shearwater assessment

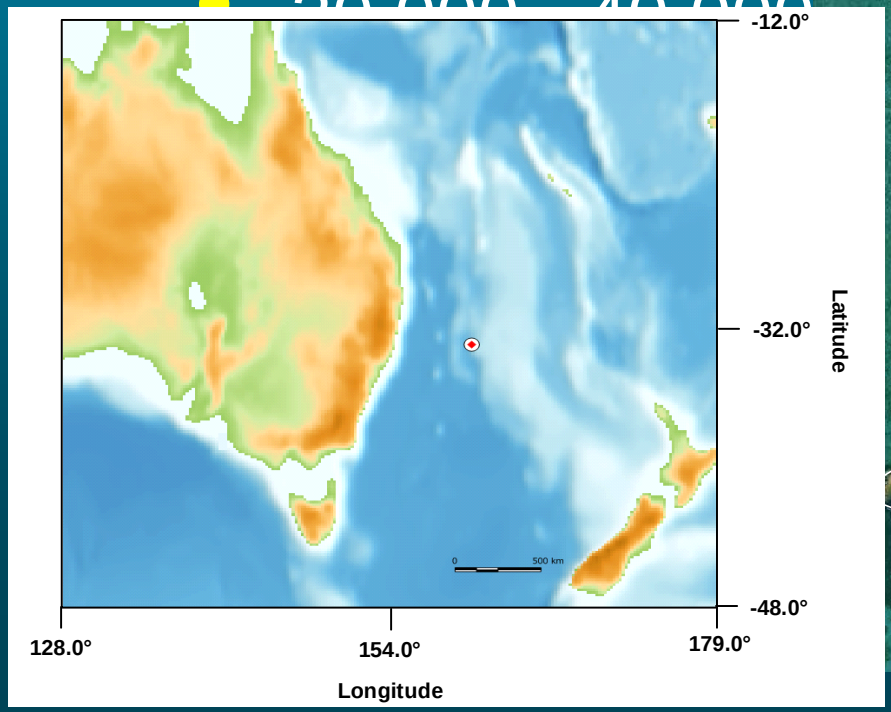
Geoff Tuck, Chris Wilcox

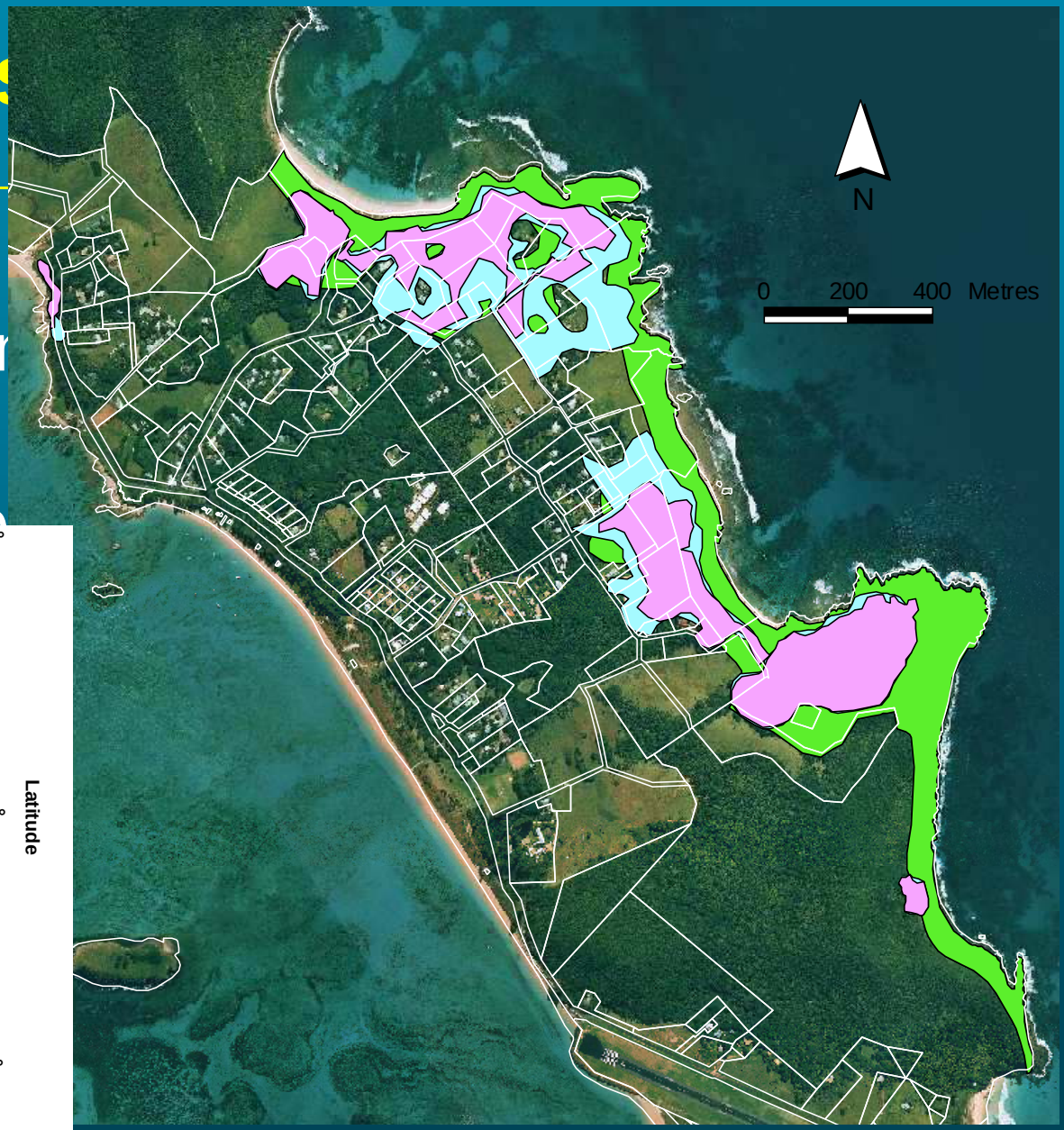
Other contributors: Sam Thalmann, Barry Baker, Scott Cooper, Tim Reid

What's

Problems at sea ar

- 20,000 – 40,000





Flesh-footed shearwater

- High bycatch observed in Australian longline fishery between 2001 and 2004
- Growing concern for their sustainability
- Need for a population assessment, BUT …

- Need to account for:
  - All sources of mortality (eg on land, all fisheries)
  - Spatio-temporal distribution of birds and fisheries
  - Operational characteristics
    - Night vs Day, swordfish vs albacore shot

Fishery Catch and Effort Data

Southern Hemisphere

- Australian Eastern Tuna and Billfish Fishery (ETBF)
- Observer data from 2001 (253 birds observed killed)
- Distant water longline fleets

Northern Hemisphere

- Japanese domestic longline fishery
- Distant water longline fleets
- Drift net (but mostly too far east)

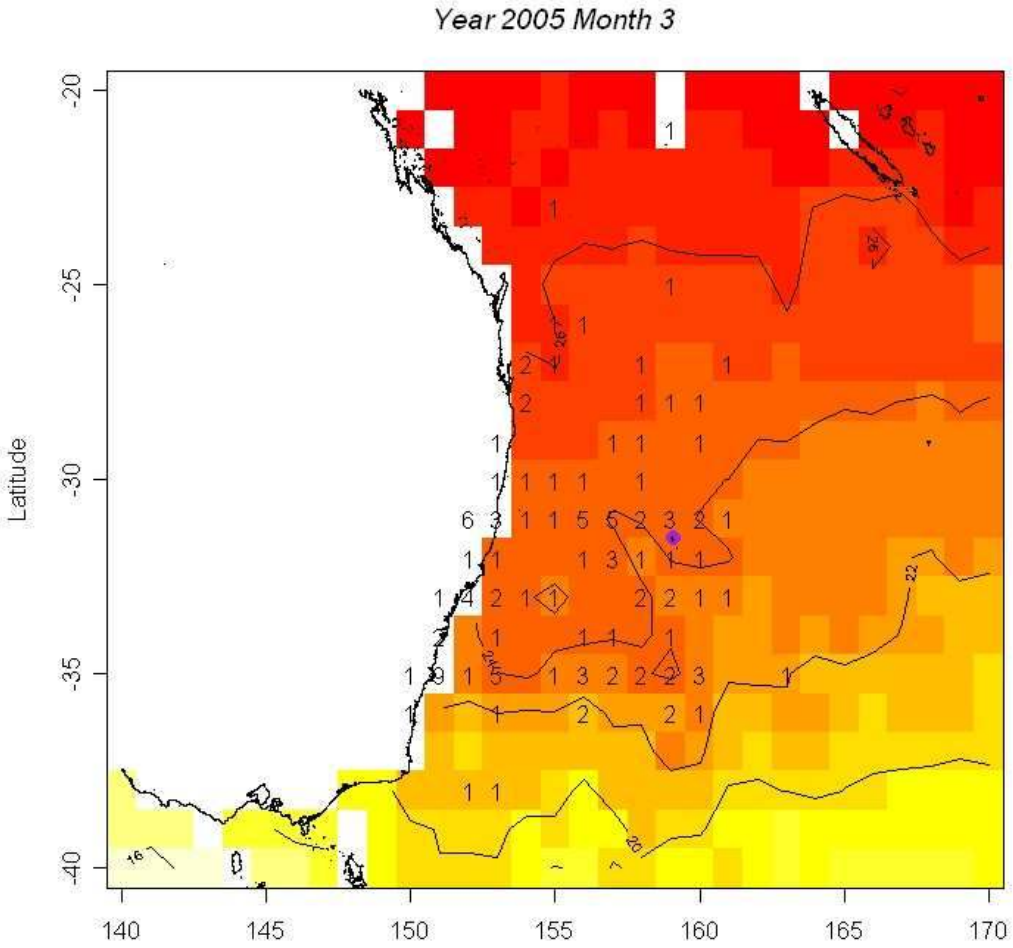
Assessment Model

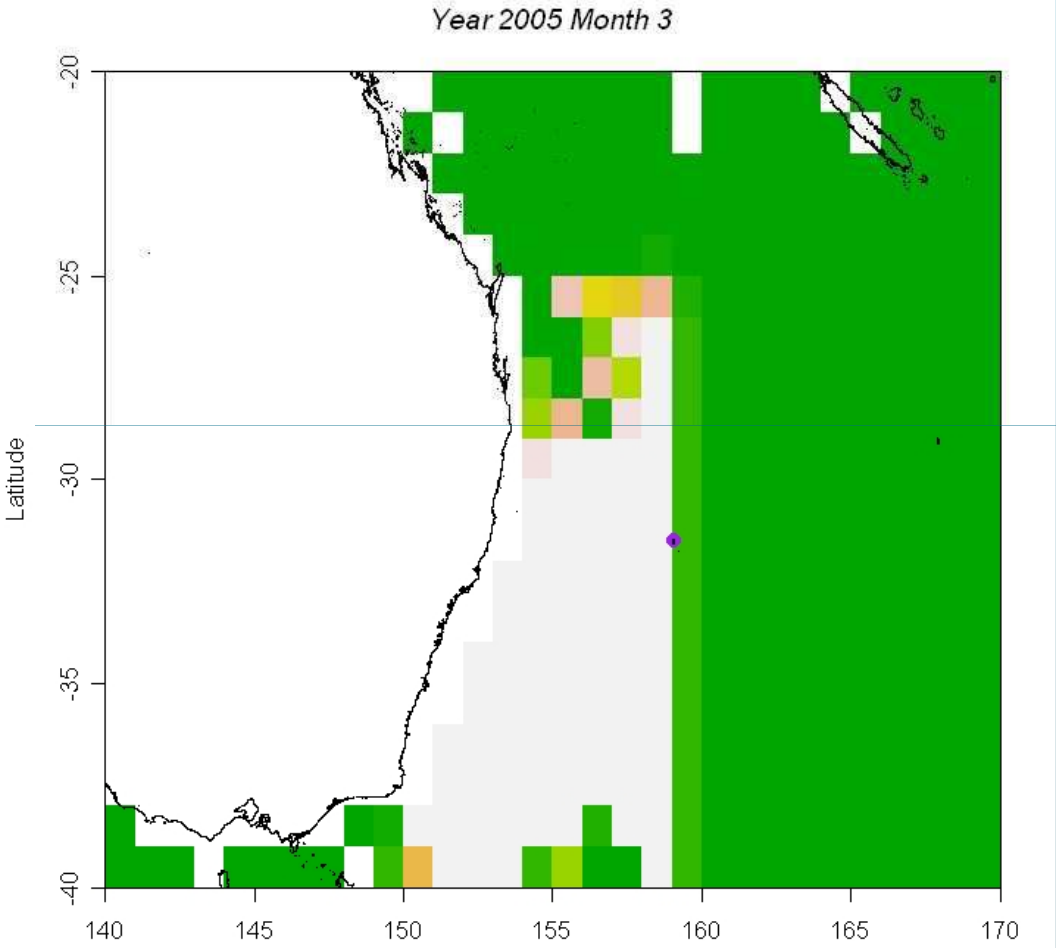
- What is the level of mortality? - by fishery & on land
- What is the current status?
- What does the future hold?
- How can we reduce impacts?

Population Model

- Age- sex-structured model
- Monthly:
  - October-April in Southern Hemisphere
  - May-September in Northern Hemisphere
- Partitioned into 6 colonies

Assessment Model





Assessment Model - Results

Assessment results not public yet.

Seabird-Fishery Analyses – Future

Bigger picture

- Continue on-water mitigation research
- Breeding habitat conservation and monitoring
- Assessments are currently not a necessary and consistent tool used in seabird/fishery management

Seabird-Fishery Analyses – Future

- Define management strategies for seabirds and simulation test
  - Better monitoring (increased observation)
  - Further development of assessment models
  - Rules to turn assessment into management action
  - Define population objectives (eg full recovery, what level?) and how you get there
  - Performance measures (is < 0.05 birds/1000 hks adequate? Not sufficient)

Thank you

Photos courtesy:

Ross Wanless (BirdLife, South Africa)

Tim Reid (CSIRO)