Climate change impacts on Important Bird and Biodiversity Area networks: implications for adaptation responses

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BirdLife INTERNATIONAL

Partnership for nature and people

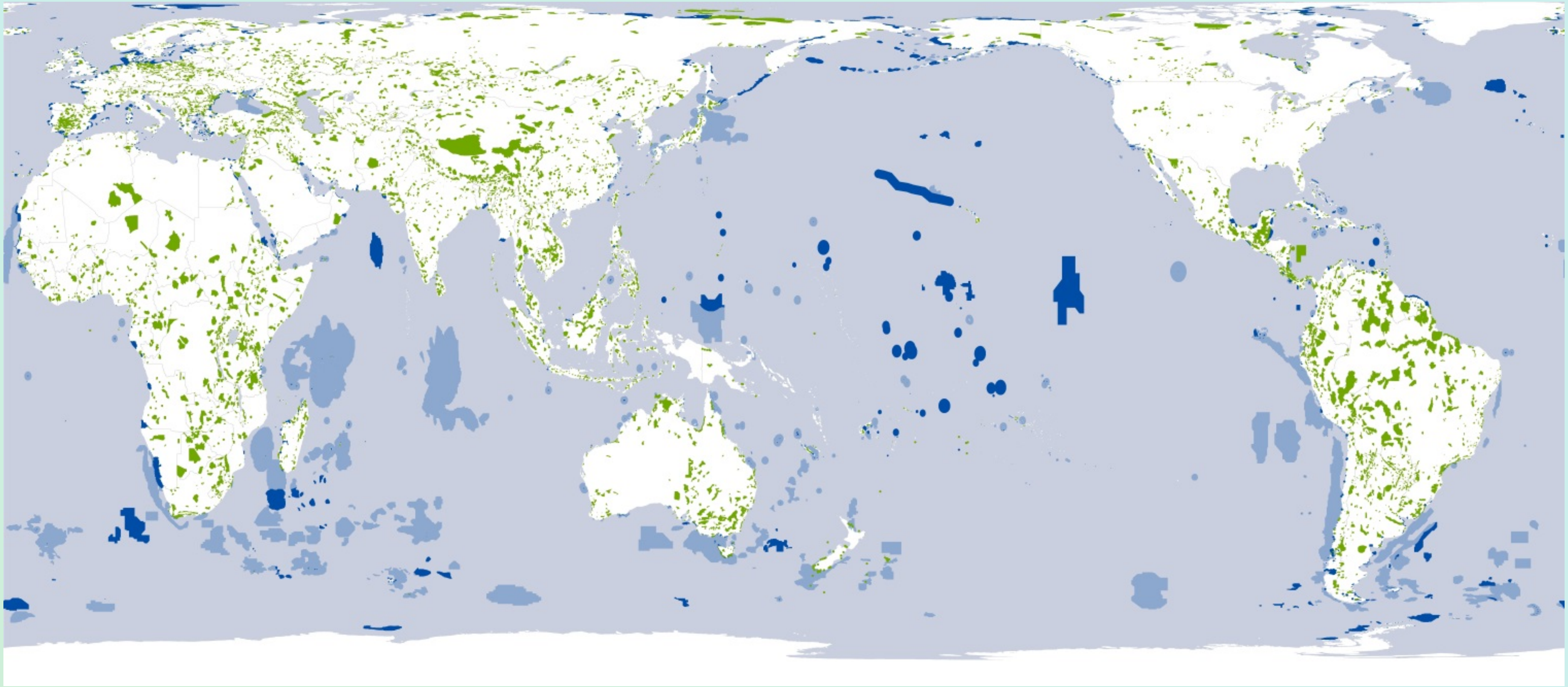
Important Bird and Biodiversity Areas

- Sites that are significant for the global persistence of biodiversity, identified using data on birds
- Globally standardized criteria with quantitative thresholds based on populations of globally threatened, restricted-range, biome-restricted, and/or congregatory species
- Actual or potential management units, i.e. candidates for protected areas
- Identified nationally through multi-stakeholder processes, coordinated by BirdLife International and its Partners

IBA
BIRDLIFE IMPORTANT BIRD AND BIODIVERSITY AREA
Four decades of conservation action

www.birdlife.org/datazone/sites

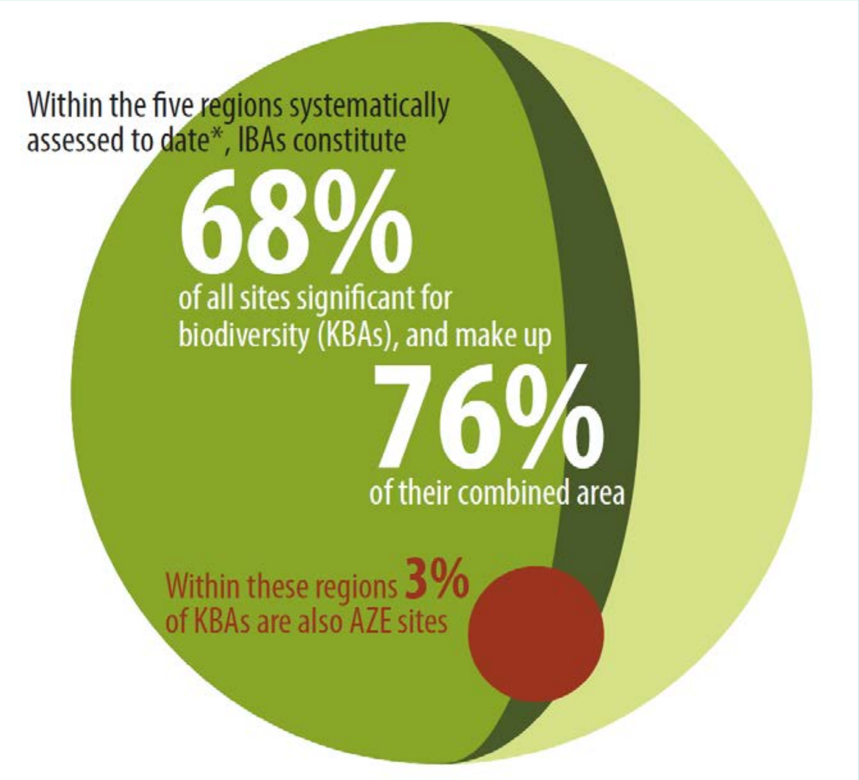
Important Bird and Biodiversity Areas



- Over 12,000 terrestrial, freshwater and marine sites identified in nearly 200 countries & territories worldwide
- The largest systematically identified network of important sites for biodiversity (& the backbone of the emerging Key Biodiversity Areas knowledge product)

Important Bird and Biodiversity Areas

- IBAs comprise >80% of Key Biodiversity Areas identified to date, and would comprise the majority of a comprehensive KBA network
- IBAs cover the distributions of 76% of amphibians, 83% of lobsters/crayfish, 87% of mammals & 99% corals
- IBAs represent “areas of particular importance for biodiversity” in Aichi Target 11, i.e. potential targets for PAs
- 22% of IBAs are completely covered by protected areas & 45% are partially covered



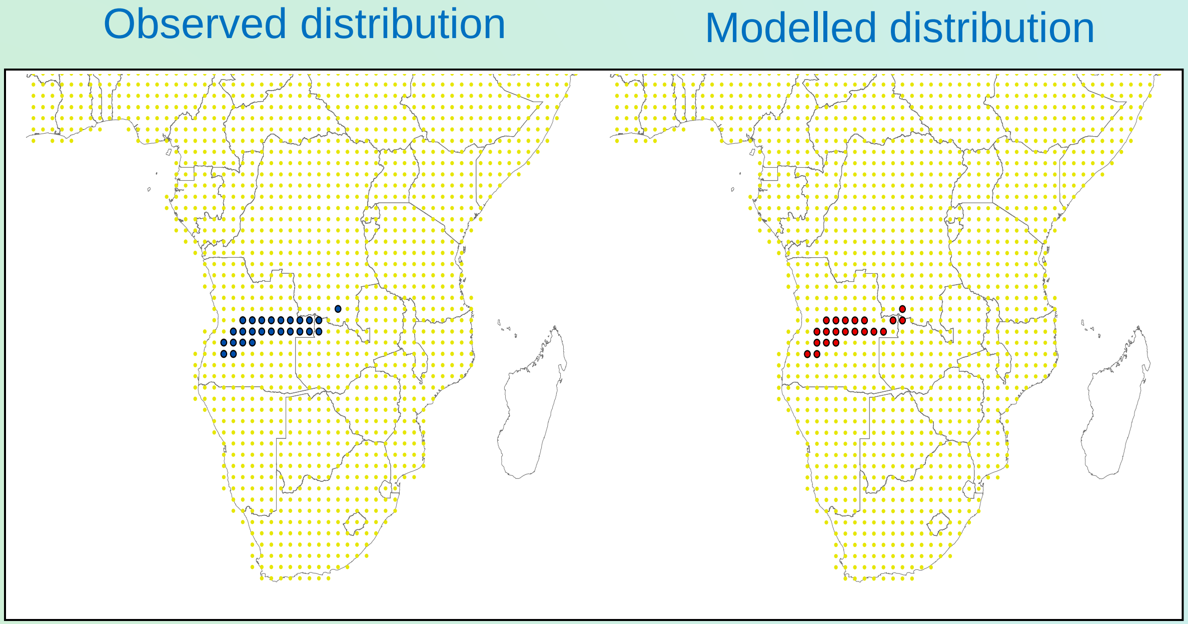
Assessing climate change impacts on IBAs

- Use species distribution modelling to assess potential impacts on the distributions of species that trigger IBA identification
- Assess which species are projected to move in and out of IBAs & when
- Synthesise results across IBA network
- Estimate overall network adequacy under climate change & identify gaps
- Identify generic classes of sites based on species turnover to determine appropriate adaptation responses

Assessing climate change impacts on species

- Combine data on bioclimate variables & species distribution to model simulated occurrence in relation to climate

Bocage's Weaver
Ploceus temporalis



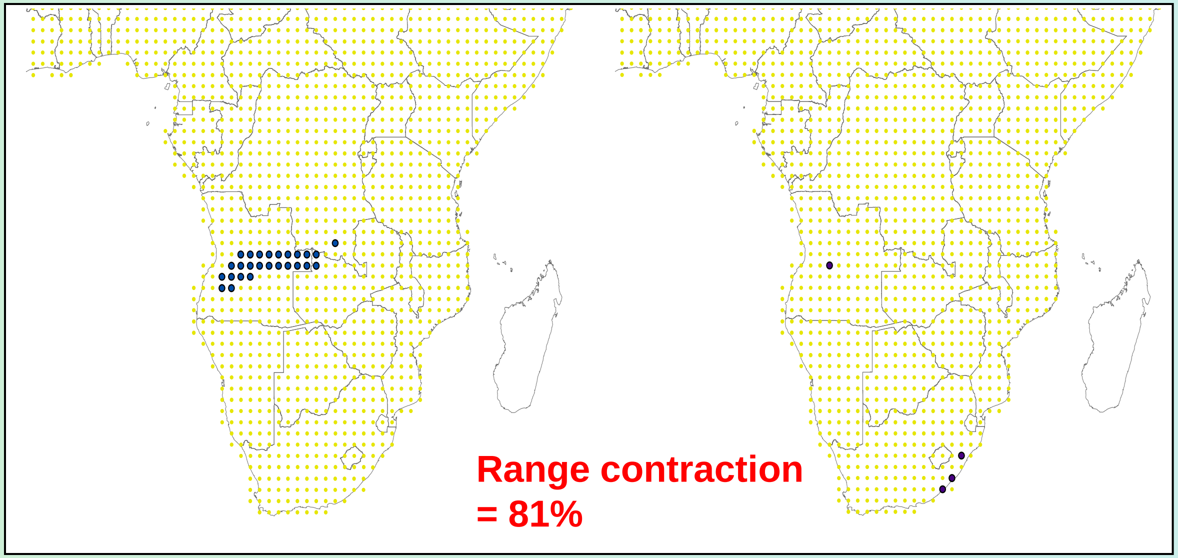
Assessing climate change impacts on species

- Apply to climate change projections to model potential future distribution

Bocage's Weaver
Ploceus temporalis

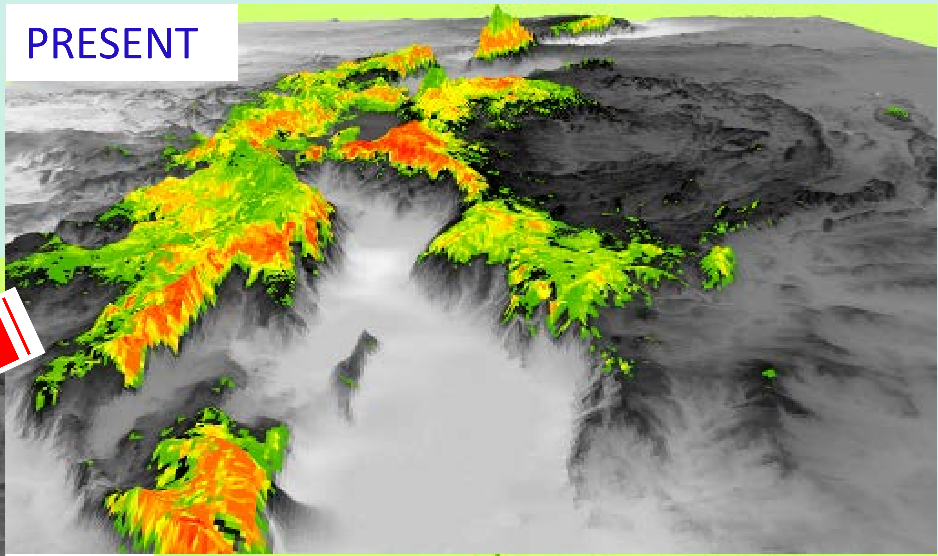
Observed distribution

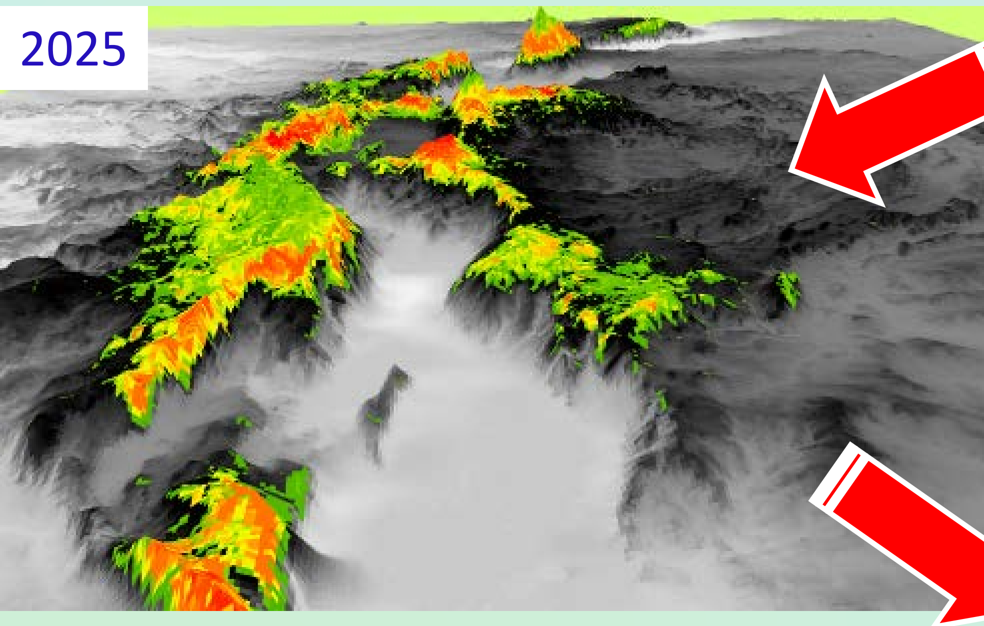
Modelled distribution

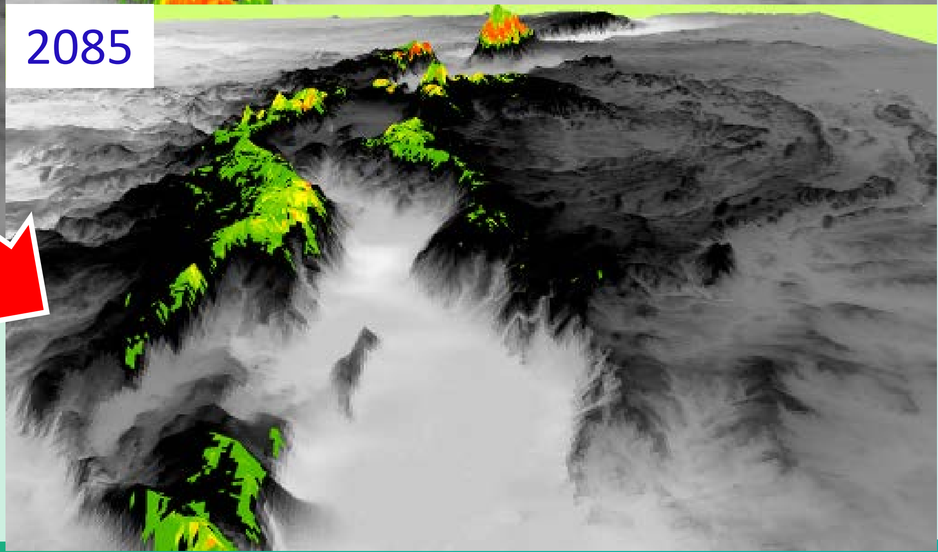


Assessing climate change impacts on species

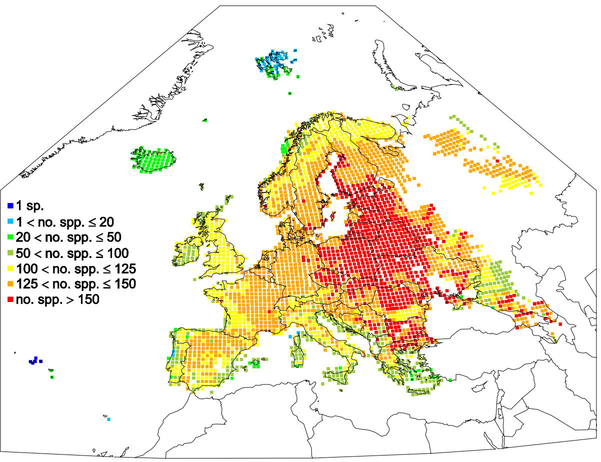
Projected species richness of 14 species endemic to the Albertine Rift

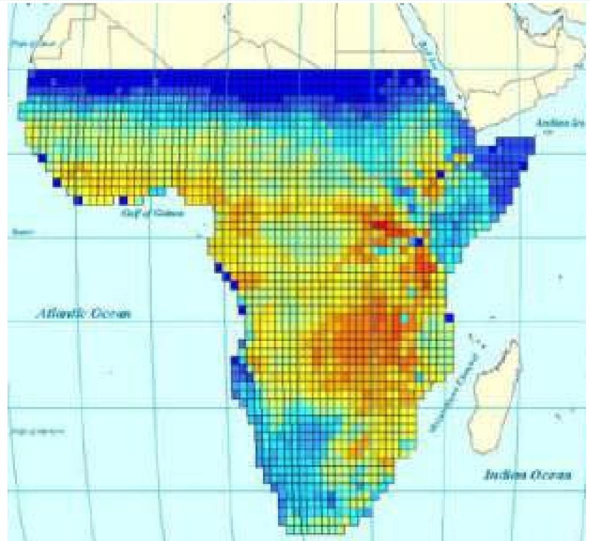


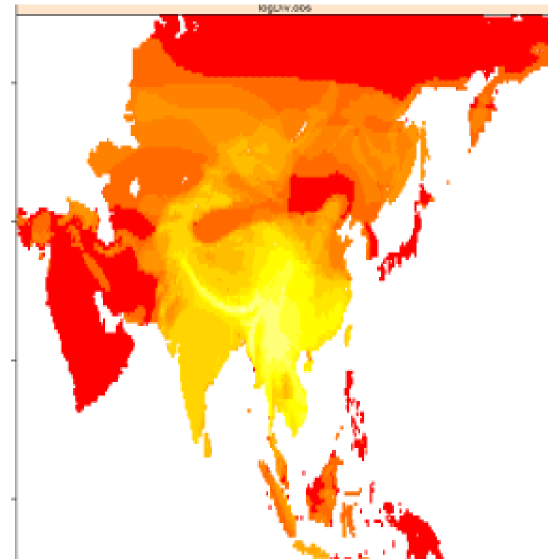


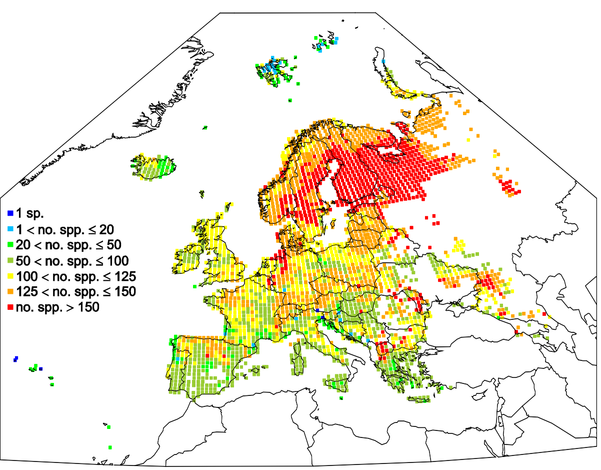


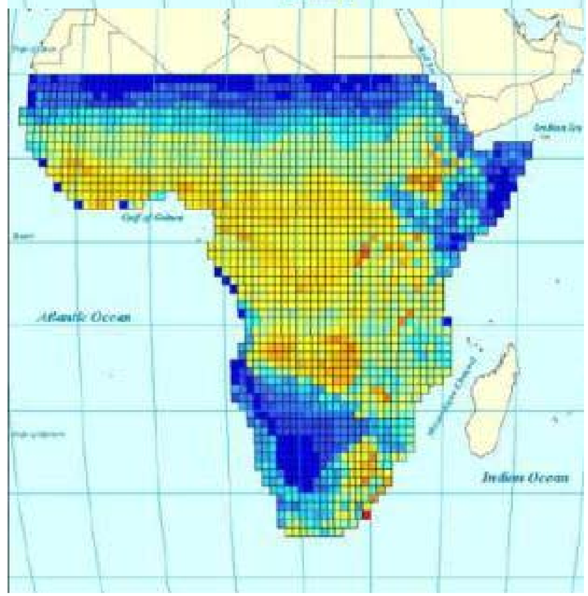
Assessing climate change impacts on species

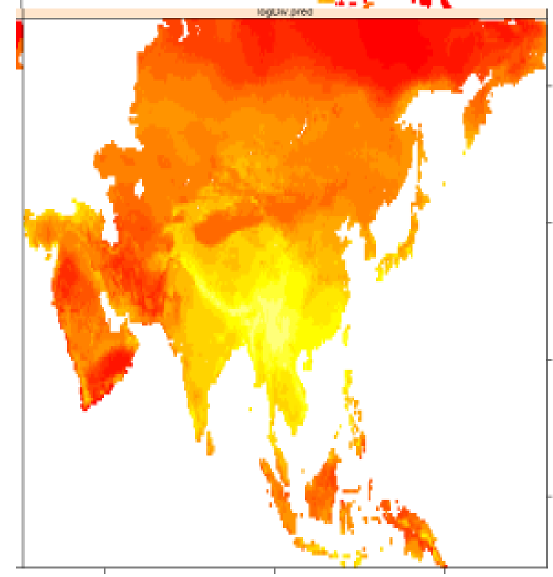






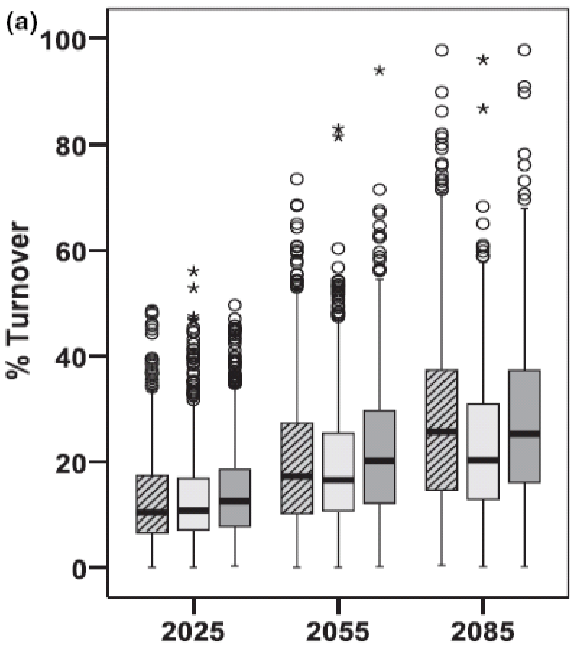






Assessing climate change impacts on IBAs

- For 863 African IBAs: 35-45% median turnover of IBA ‘trigger’ species by 2100
- >50% turnover at 42% of IBAs
- 88-92% of species retain suitable climate in ≥ 1 IBA in which currently found
- Only 7-8 species lose suitable climate from the entire network

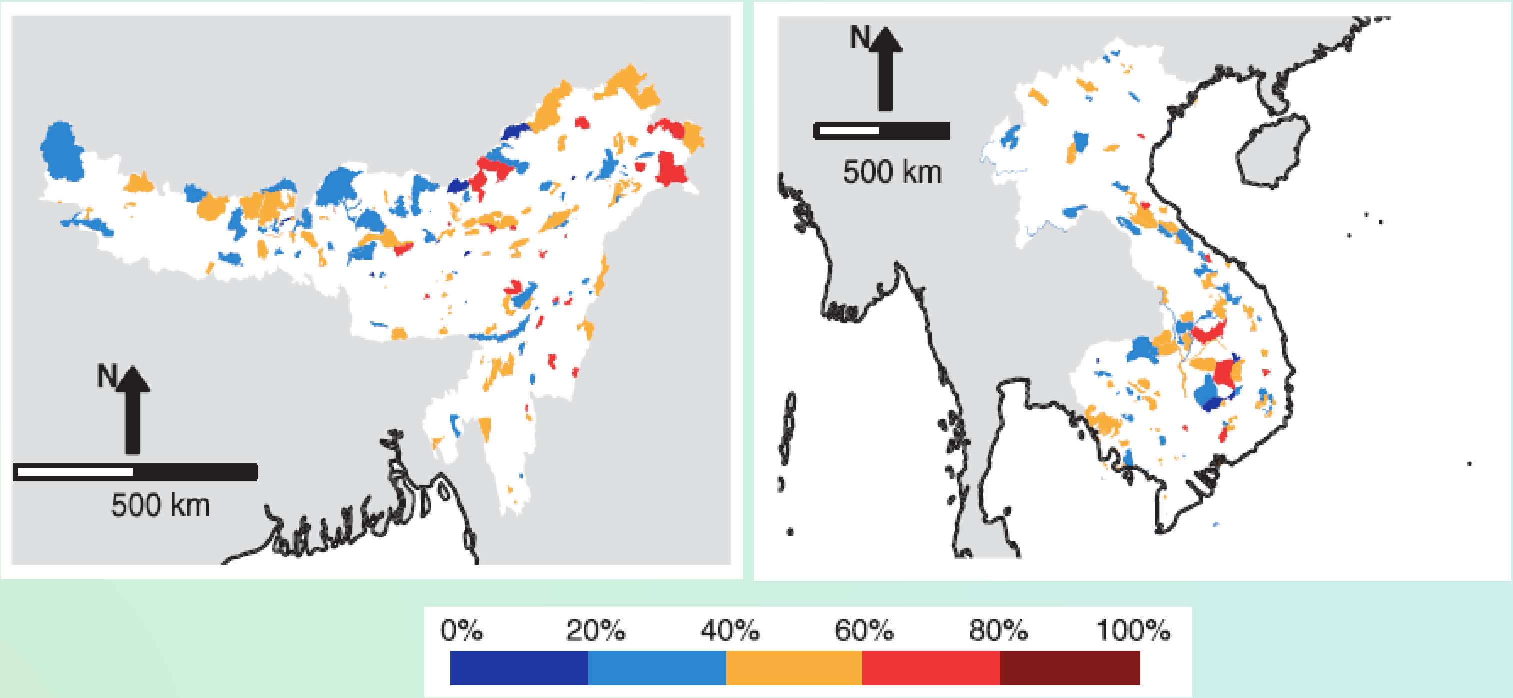


Hole *et al*. 2009 *Ecol. Letters* 12: 420-431

Assessing climate change impacts on IBAs

For 303 IBAs in Eastern Himalaya and the Lower Mekong:

- Median turnover of IBA trigger species = 43% by 2100

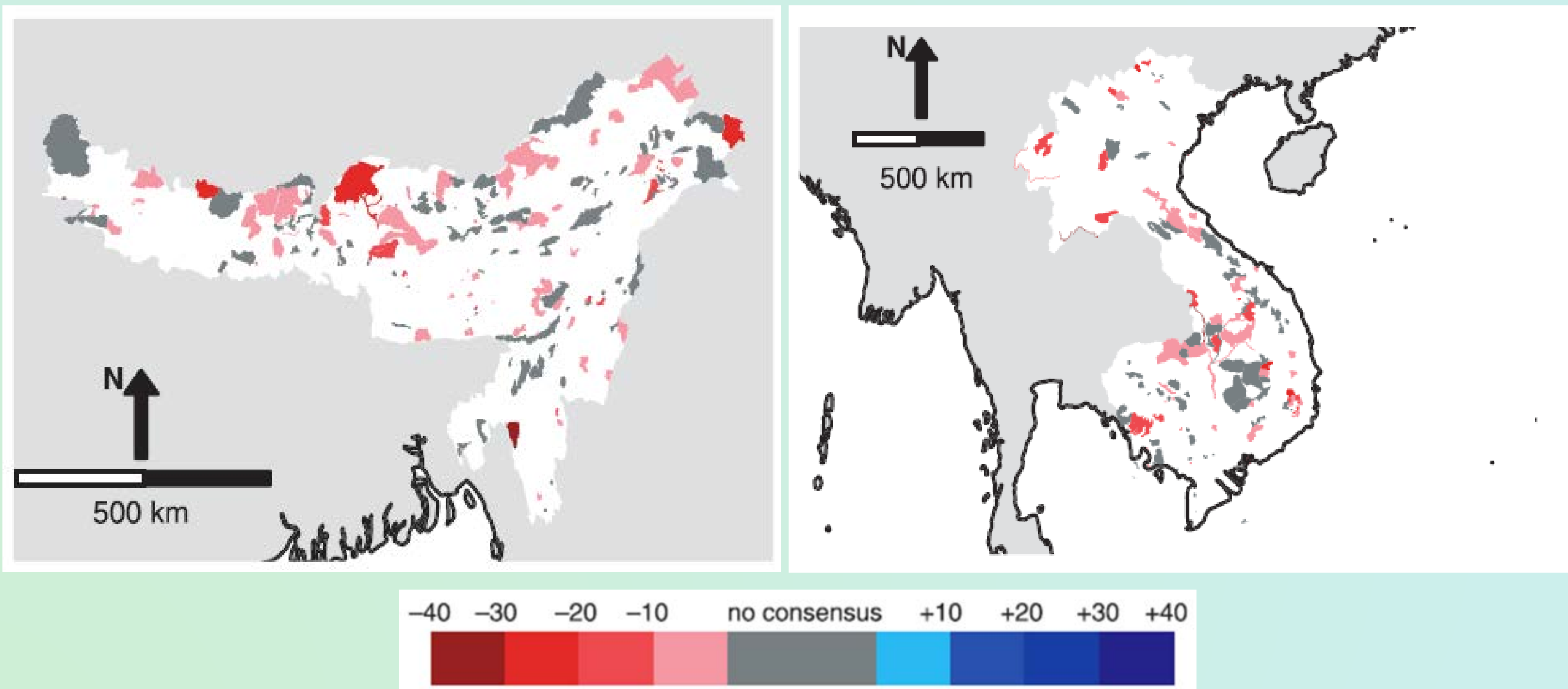


Bagchi *et al*. 2012 *Global Change Biol.* 19: 1236-1248

Assessing climate change impacts on IBAs

For 303 IBAs in Eastern Himalaya and the Lower Mekong:

- Overall richness is projected to decline in 47% of IBAs

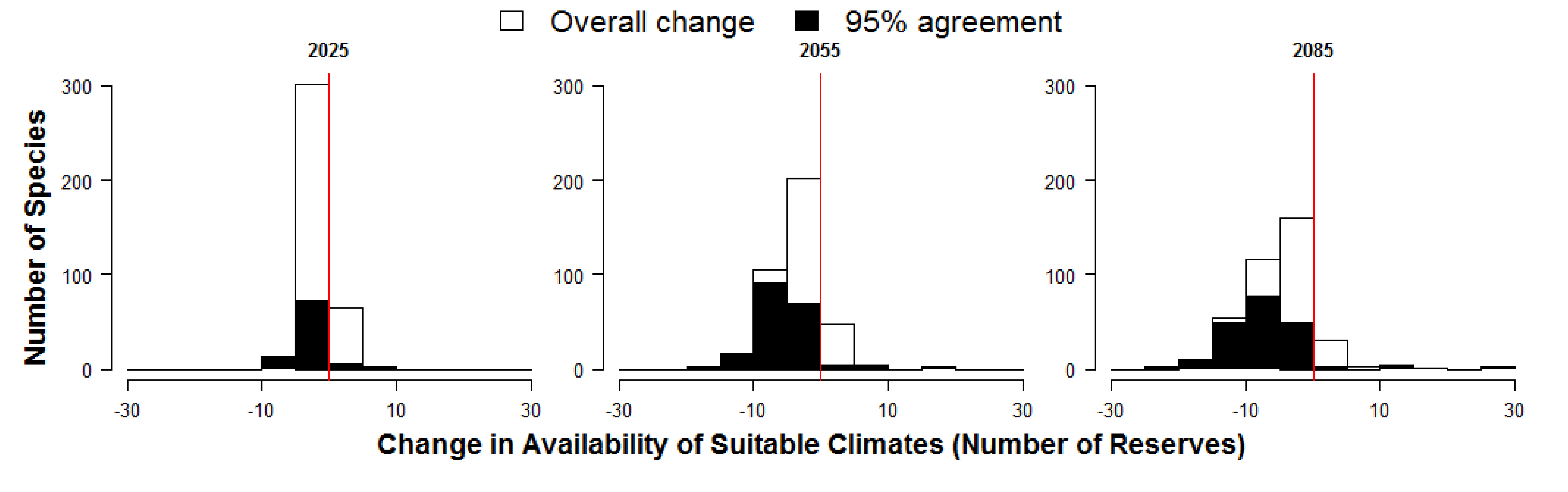


Bagchi *et al*. 2012 *Global Change Biol.* 19: 1236-1248

Assessing climate change impacts on IBAs

For 303 IBAs in Eastern Himalaya and the Lower Mekong:

- 50% of species are projected to lose representation in current IBAs by 2100
- But for no species was suitable climate ‘extremely likely’ to be completely lost from the network



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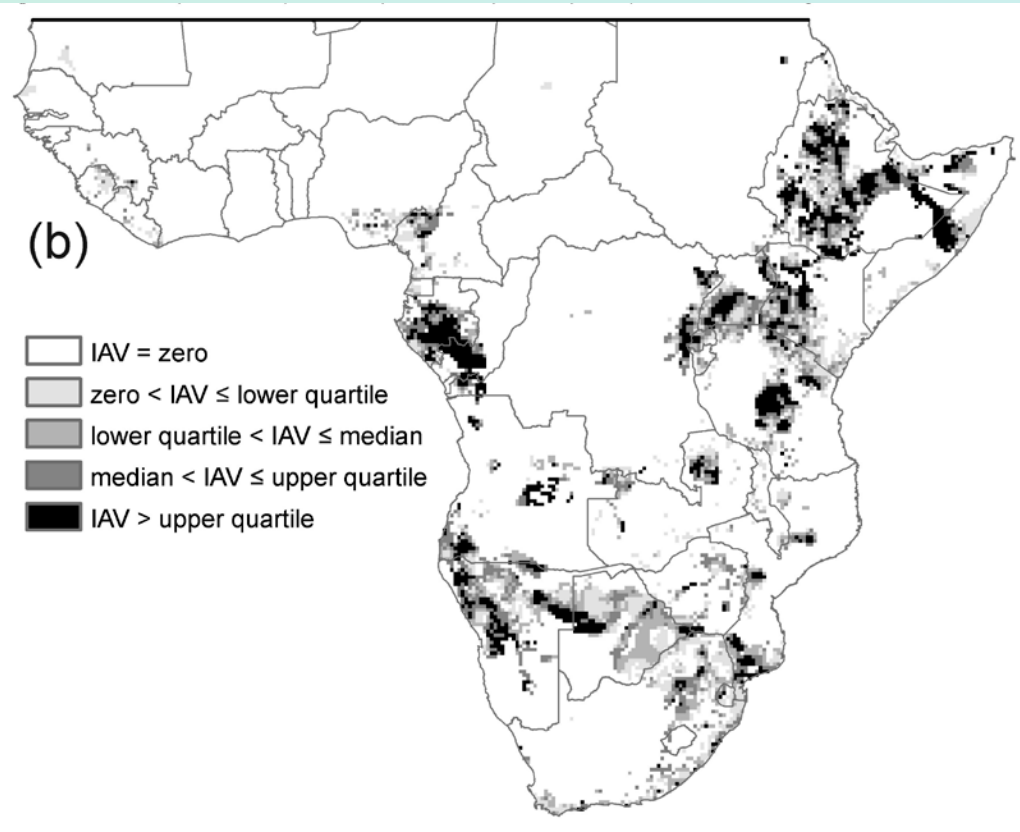
Identifying potential future gaps in the network

Index of added value (IAV):

- ➢ potential value of the cell for priority species least supported in future by existing IBAs
- ➢ importance of the cell as a location through which large numbers of species are projected to move
- ➢ extent to which the cell is remote from existing IBAs

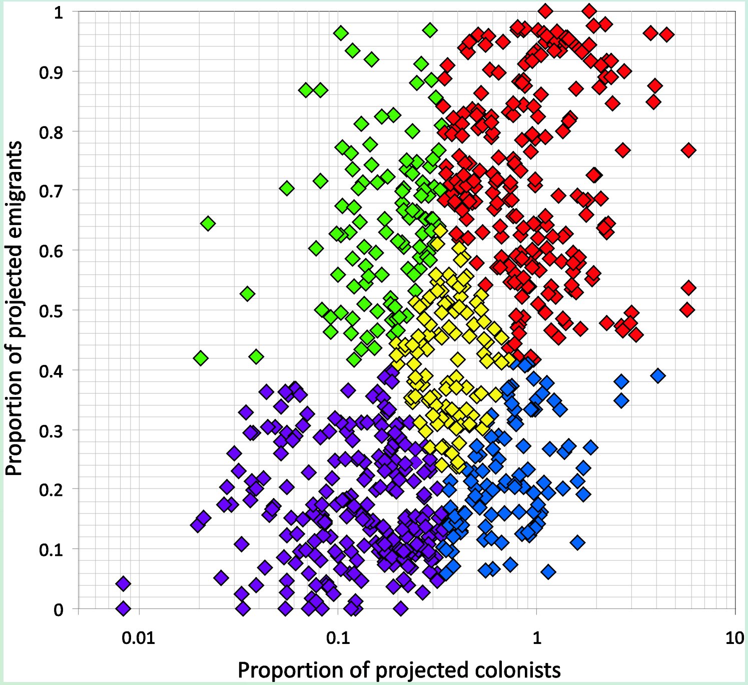
- Values are grouped in quartiles, higher quartiles shaded darker

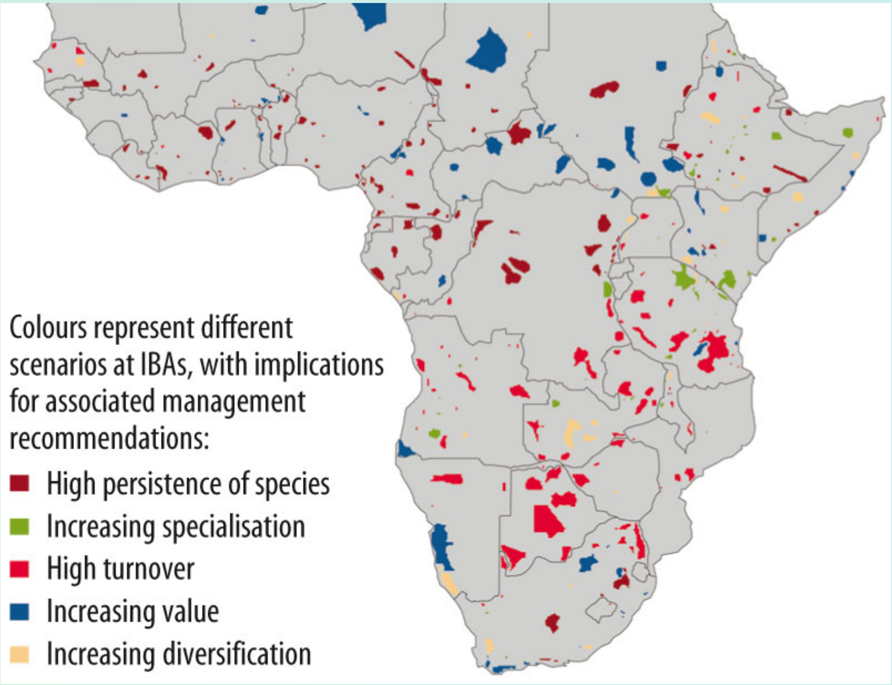


Hole *et al*. 2011 *Cons. Biol.* 25: 305-315

Identifying adaptation actions

- Categorise IBAs according to ratio of expected emigrants and colonists





Hole *et al*. 2011 *Cons. Biol.* 25: 305-315

Identifying adaptation actions

- Management requires balance between continued provision of appropriate conditions for current trigger species with provision of appropriate habitat for projected colonists
- Identify management options for different categories:
- ➢ habitat management, restoration and creation (+ site expansion) aimed at maximising extent & suitability of habitats for potential colonists/emigrants/ persistent species
- ➢ management of matrix to provide corridors/ stepping stones/facilitate dispersal
- ➢ translocation of potential emigrants/colonists
- ➢ management options needed for all categories: manage invasives, control hunting & manage buffers

Conclusions

- Species distribution modelling can be used to project impacts on site network
- Considerable turnover in species projected at each IBA
- Reduced representation of many priority species by 2100
- But IBA network retains suitable climate for nearly all species
- Results can be used to identify which sites need expansion, where new sites may be needed, and management actions needed for adaptation
- Caveats: assumes species will be able to disperse, vegetation will track climate fast enough, ignores interactions between species, ignores land-use and human responses to climate change… some of which are now being addressed