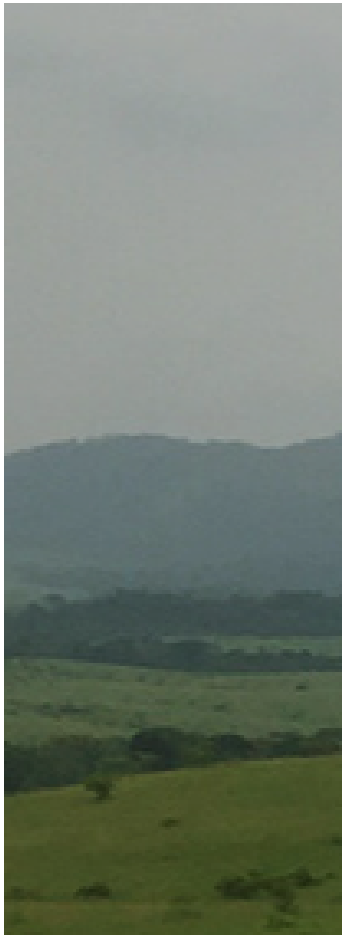
Ecosystem Change Research Group

17 April 2019

Research focus and key themes

Focus on the ecological and anthropological drivers of change in ecosystems and ecosystem services for the benefit of nature and people



- Ecosystem change & complex systems modelling
- Social ecological systems
- Conservation & conflicts
- Climate change impacts
- Habitat management, protected areas & species conservation planning
- Ecosystem function & services
- Land use change impacts
- Wildlife responses to anthropogenic change

People of Ecosystem Change

Focus on the ecological and anthropological drivers of change in ecosystems and ecosystem services for the benefit of nature and people

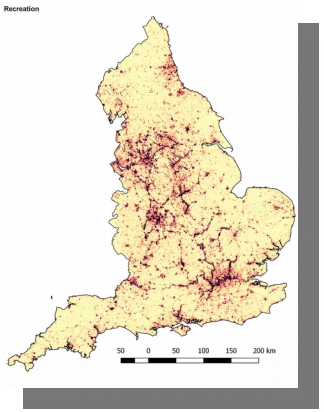
- Katharine Abernethy
- Daniel Chapman
- Jeremy Cusack
- Daisy Dent
- Brad Duthie
- Elisa Fuentes-Montemayor
- Isabel Jones
- Alistair Jump
- Jeroen Minderman
- Kirsty Park
- Sarobidy Rakotonarivo
- Thiago Silva
- Robin Whytock

Dr Daniel Chapman (Lecturer in Ecological Modelling)

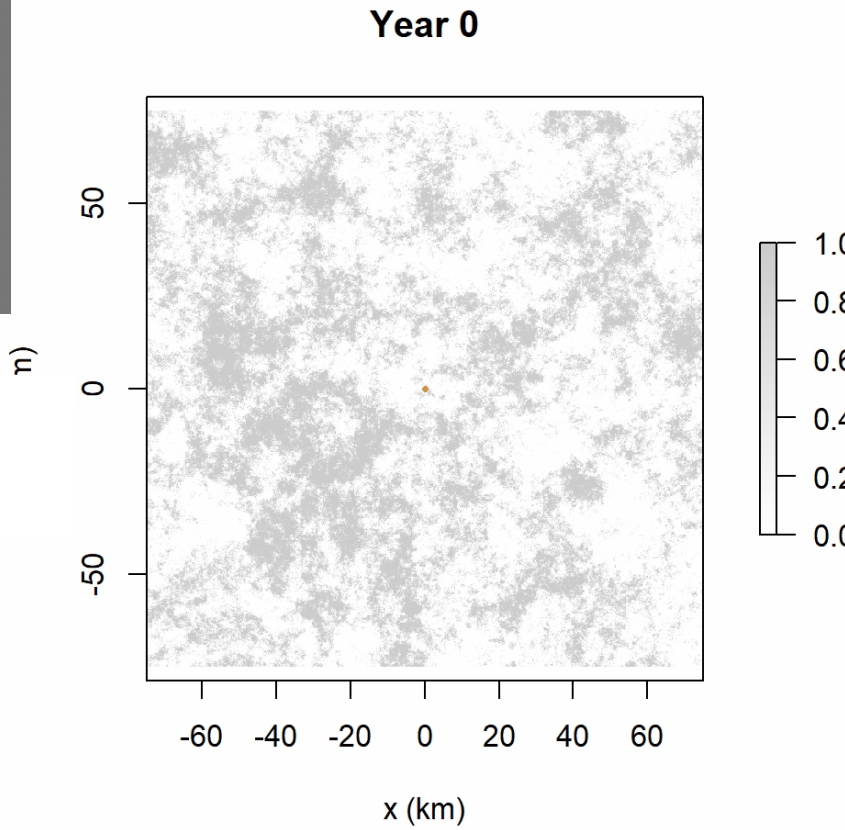
Modelling invasive species and emerging diseases

Global introduction pathways

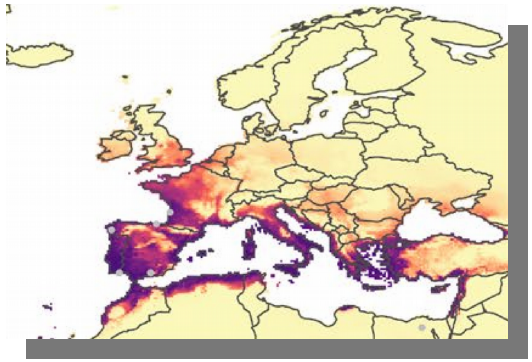
Introduction pressure



Spread dynamics and control strategies

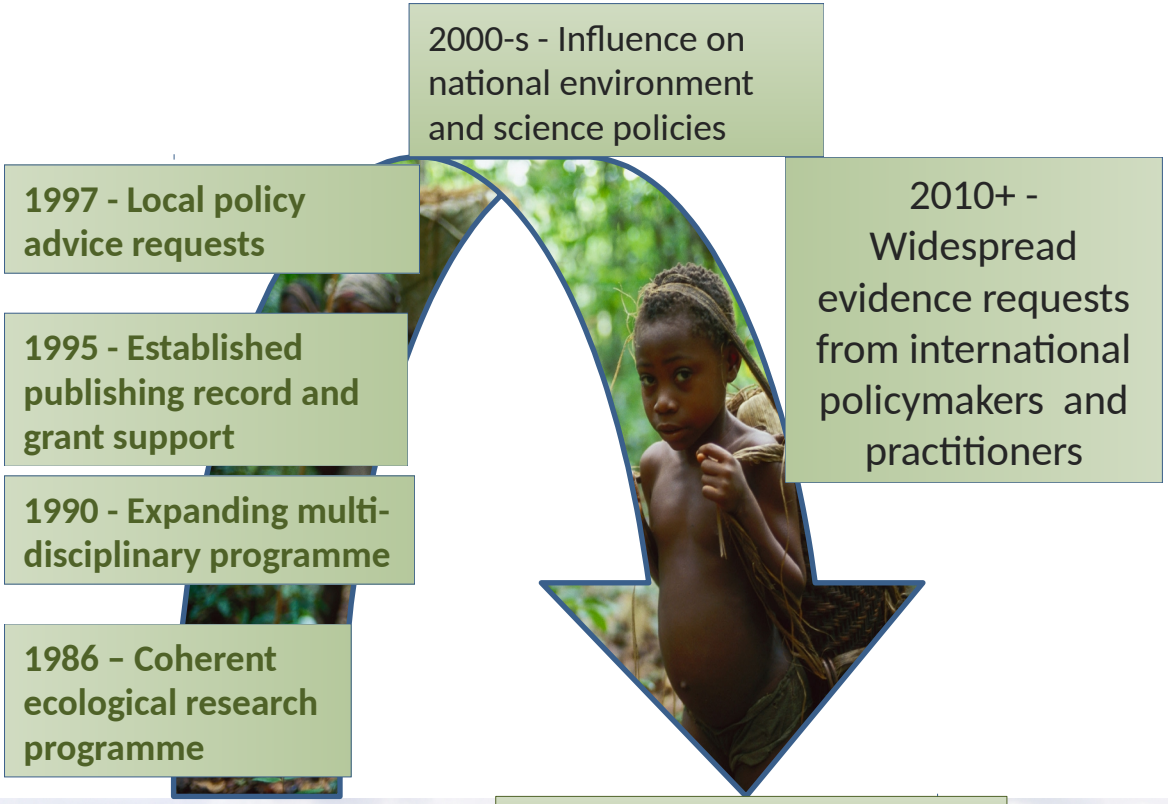


Climate suitability modelling



Gabon Programme:

From field research to influencing governance and policies



1980 - Ecological research projects in field

1986 – Coherent ecological research programme

1990 - Expanding multi-disciplinary programme

1995 - Established publishing record and grant support

1997 - Local policy advice requests

2000-s - Influence on national environment and science policies

2010+ - Widespread evidence requests from international policymakers and practitioners

2020
Demonstrable Impacts on policy and practice in Gabon

Current themes

- Afrotropical carbon balances and Earth system
- Sustainable use of wild resources
- Climate change and ecosystem productivity responses
- Local communities in conservation planning
- Biomonitoring and protected area success
- Conservation of Ecologically dimorphic species

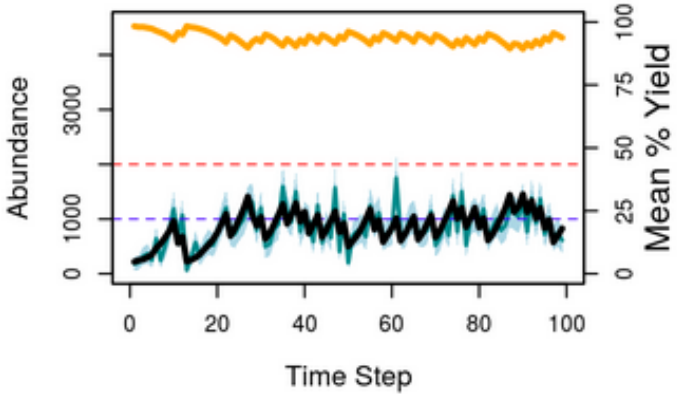
I Staff member (50% FTE)
1 Research Fellow
2 Visiting Researchers
3 PDRA
5 PhD students

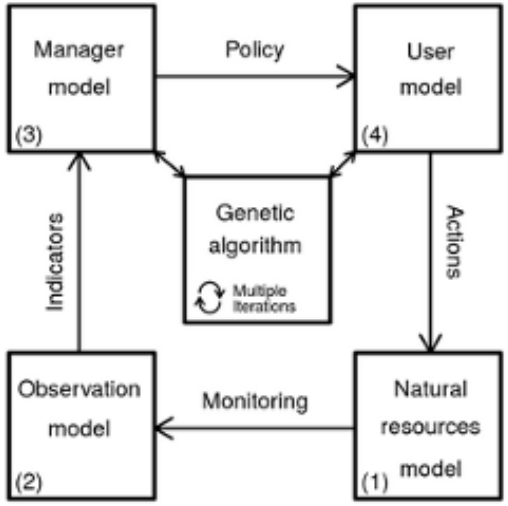
How green is clean?
Using biodiversity and energy justice to resolve conflicts between Sustainable Development Goals

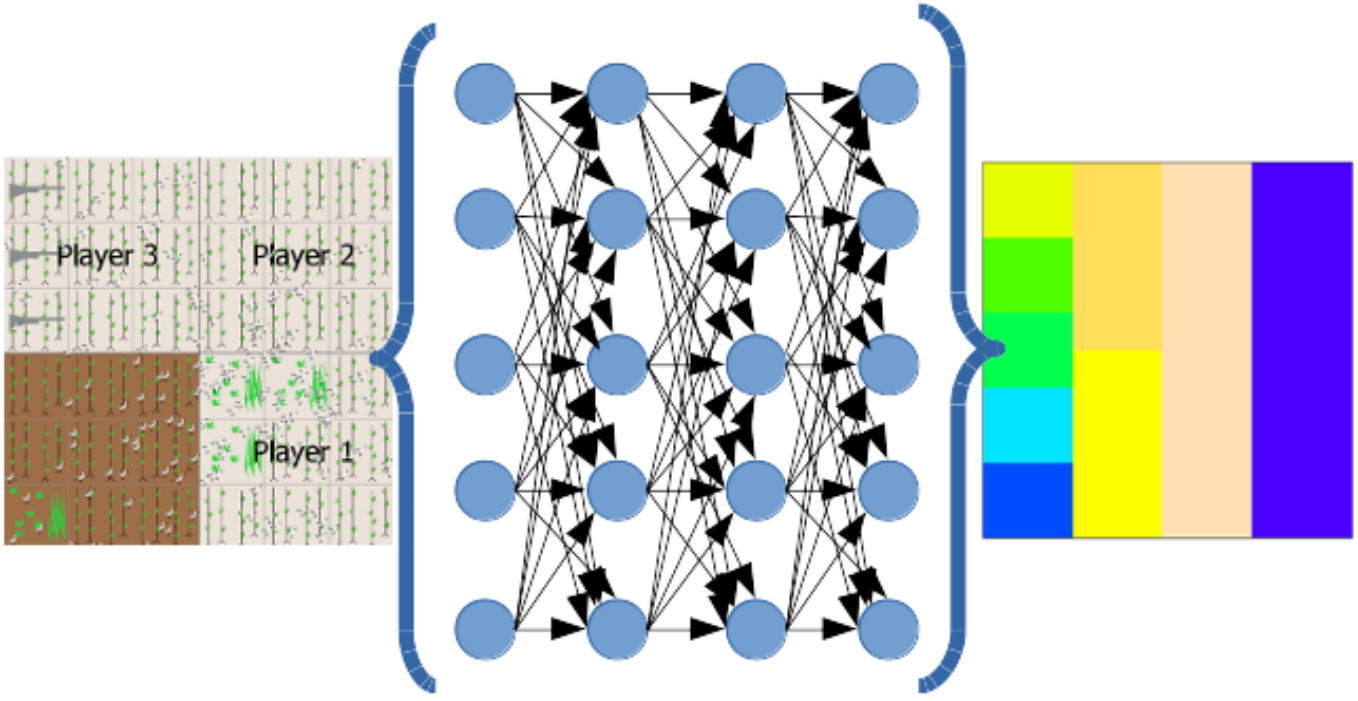
- Conflicts between SDGs with **competing objectives** precludes **sustainable development**
- Hydropower as a **model system** to investigate SDG conflicts (**water-energy-food nexus**)
- Trade-offs and decision-making involve multiple **stakeholders** @ **multiple scales** (**local** vs **national** vs **global**)
- Novel pathways to **conflict resolution** applicable to other contexts

Isabel Jones
@_Isabel_Jones

GMSE: Modelling conservation conflict

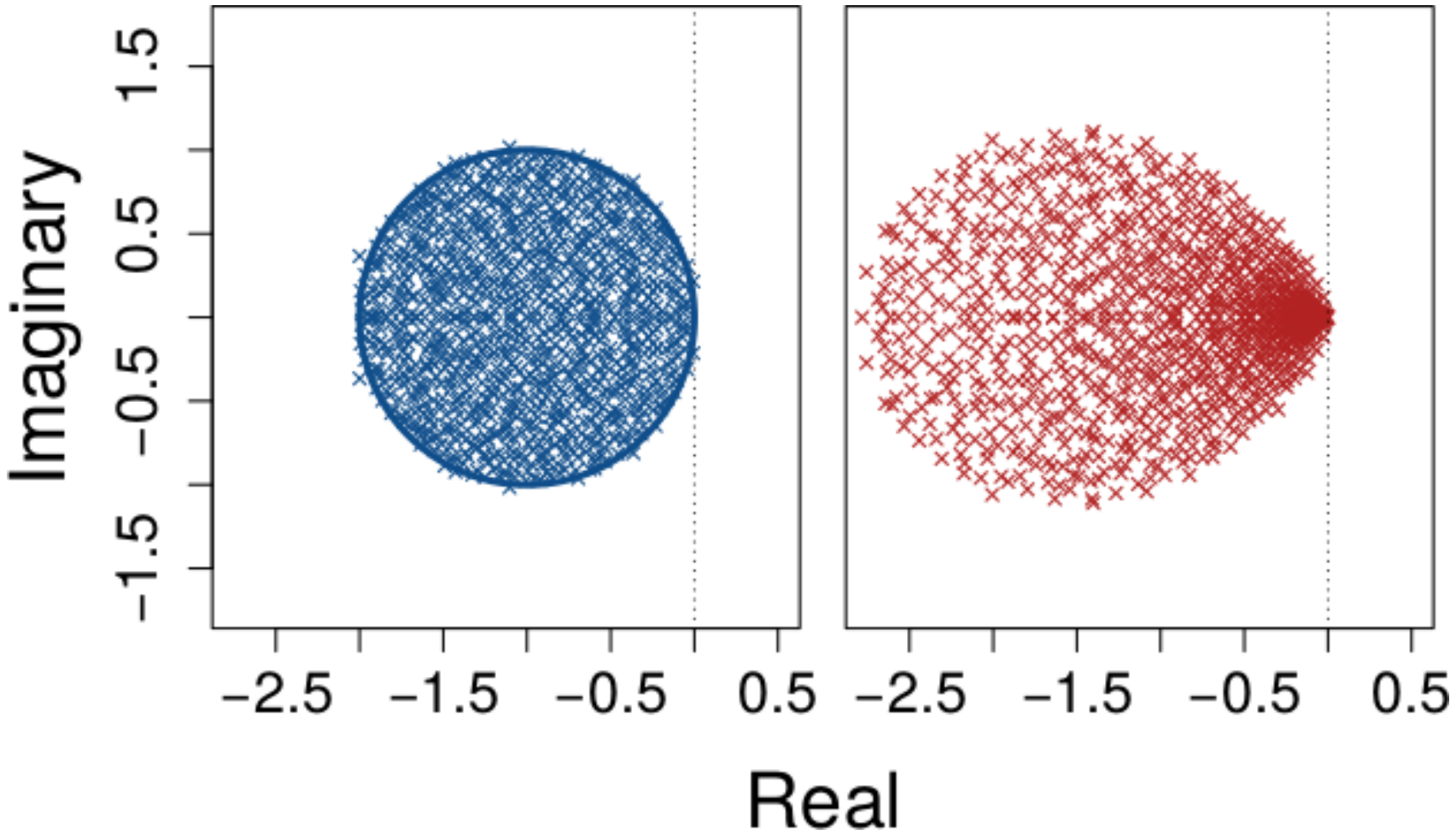






Stability of complex systems (random matrix theory)

$$\frac{d\mathbf{v}(t)}{dt} = \gamma \mathbf{A}\mathbf{v}(t).$$



Needs and opportunities

- Time series modelling of tree growth under environmental change
- Machine learning for image analysis (identification)
- Software development (applied to data collection)
- Neural network development & training from stakeholder behaviour data
- Analytical proofs concerning properties of random matrices
- Generalisation of fundamental equations of ecology & evolution