

**ANYL4PSD**  
**REGIONAL TEACH-IN ON**  
**CLIMATE JUSTICE**  
**12-13 MAY 2022**

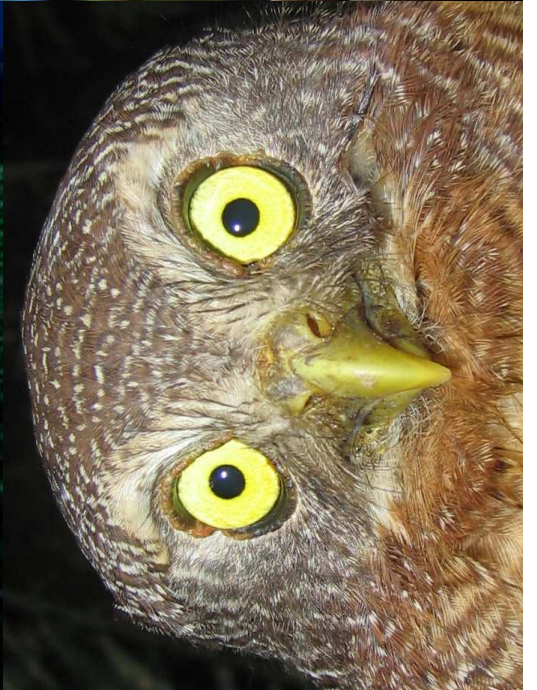


# Conservation Prioritization in the Congo Basin: Planning for 2080

Thomas B. Smith, Trevon L. Fuller, Ying Zhen, Virginia Zaunbrecher, Henri A. Thomassen, Kevin Njabo, Nicola M. Anthony, Mary K. Gonder, Wolfgang Buermann, Brenda Larison, Kristen Ruegg. Ryan Harrigan

Congo Basin Institute





# Multifarious Threats

**Deforestation**

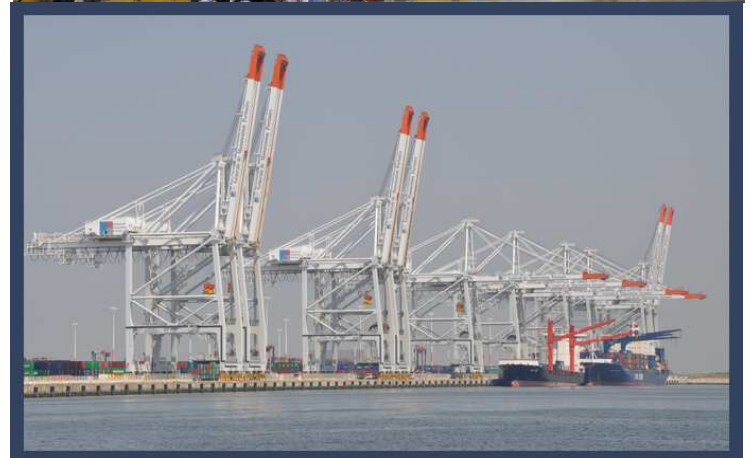
**Overpopulation**

**Mining**

**Infrastructure**

**Wildlife Trafficking**

**Climate Change**



**How best to conserve?**



# How best to conserve?

Rather than a focus on single habitats



**Need to protect complex habitats**

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Rather than a focus on single habitats

➔ **Need to protect complex habitats**

Rather than preserving only biodiversity hotspots

➔ **Need focus on processes that produce and maintain biodiversity**

# How best to conserve?

Rather than a focus on single habitats

➔ **Need to protect complex habitats**

Rather than preserving only biodiversity hotspots

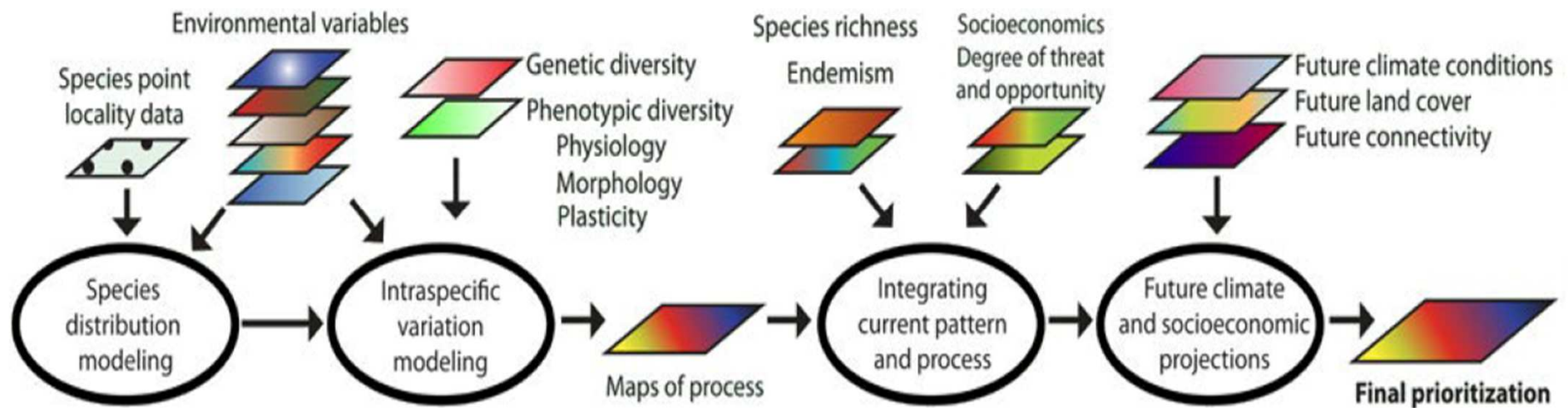
➔ **Need focus on processes that produce and maintain biodiversity**

Rather than mitigating one threat at a time

➔ **Need an integrated approach that mitigates multiple threats simultaneously**



# Mapping priority areas for conserving biodiversity under climate change

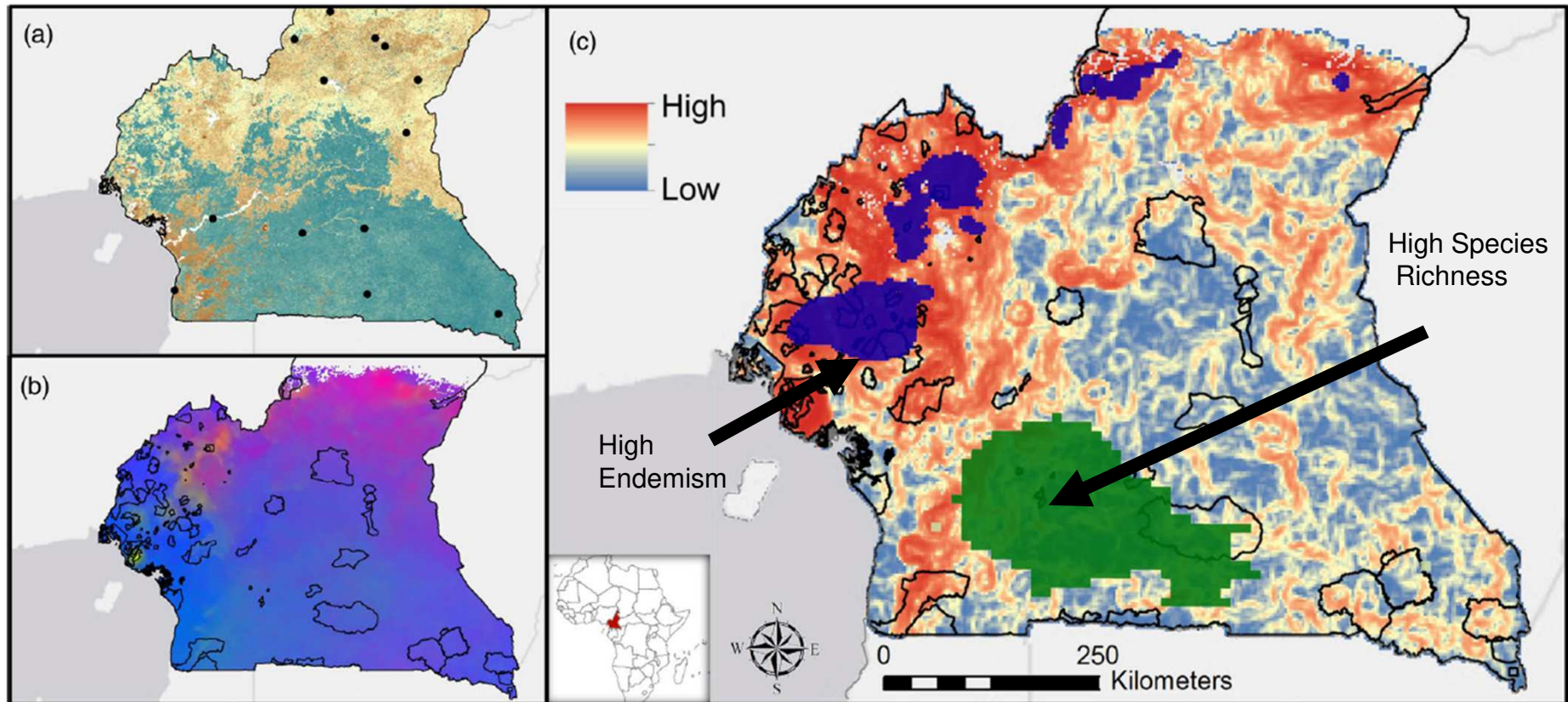


# Example

## Little Greenbul (*Andropadus virens*)



# Genomic variation and turnover of the little greenbul across its range



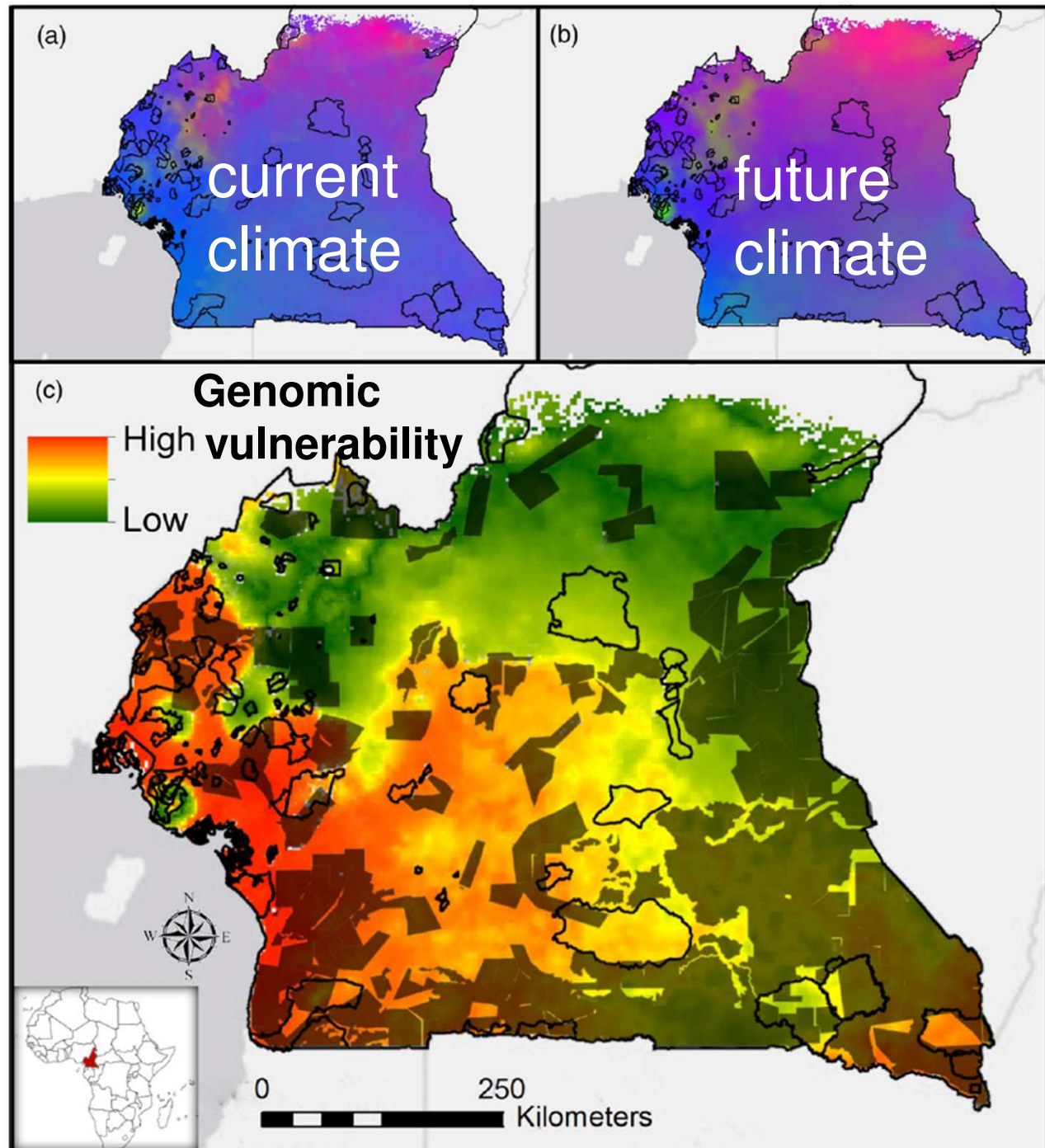
Zhen et al. 2019 Molecular Ecology  
Smith et al. 2020 Evolutionary Applications

# Patterns of genomic diversity and genomic vulnerability under current and future climate

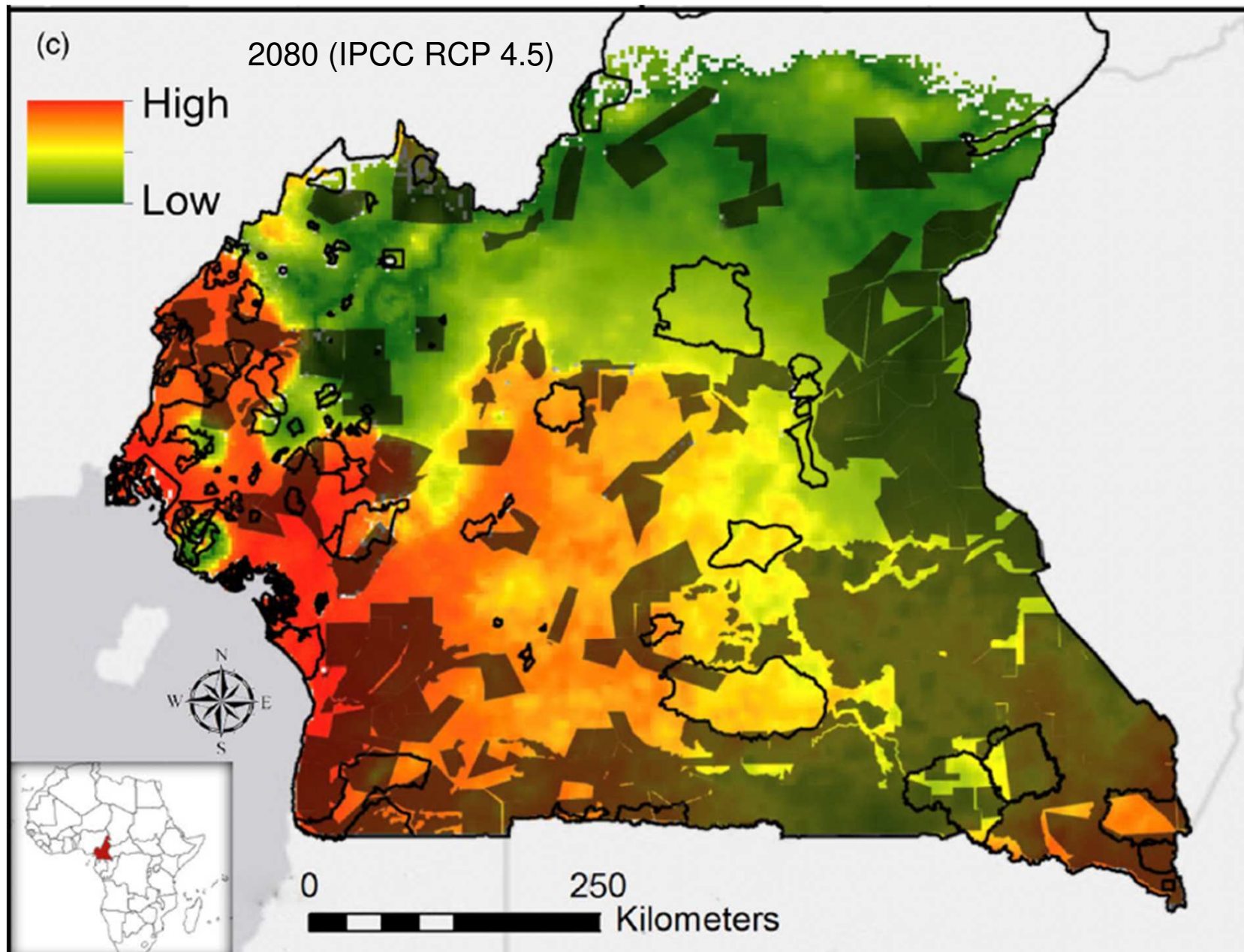
**genomic vulnerability** = mismatch between current and predicted future genomic variation based on genotype-environment relationships modeled across contemporary populations

35,000 SNPs filtered to 7,000 correlated with current climate

RCP 4.5 2080 scenario



# Genomic vulnerability

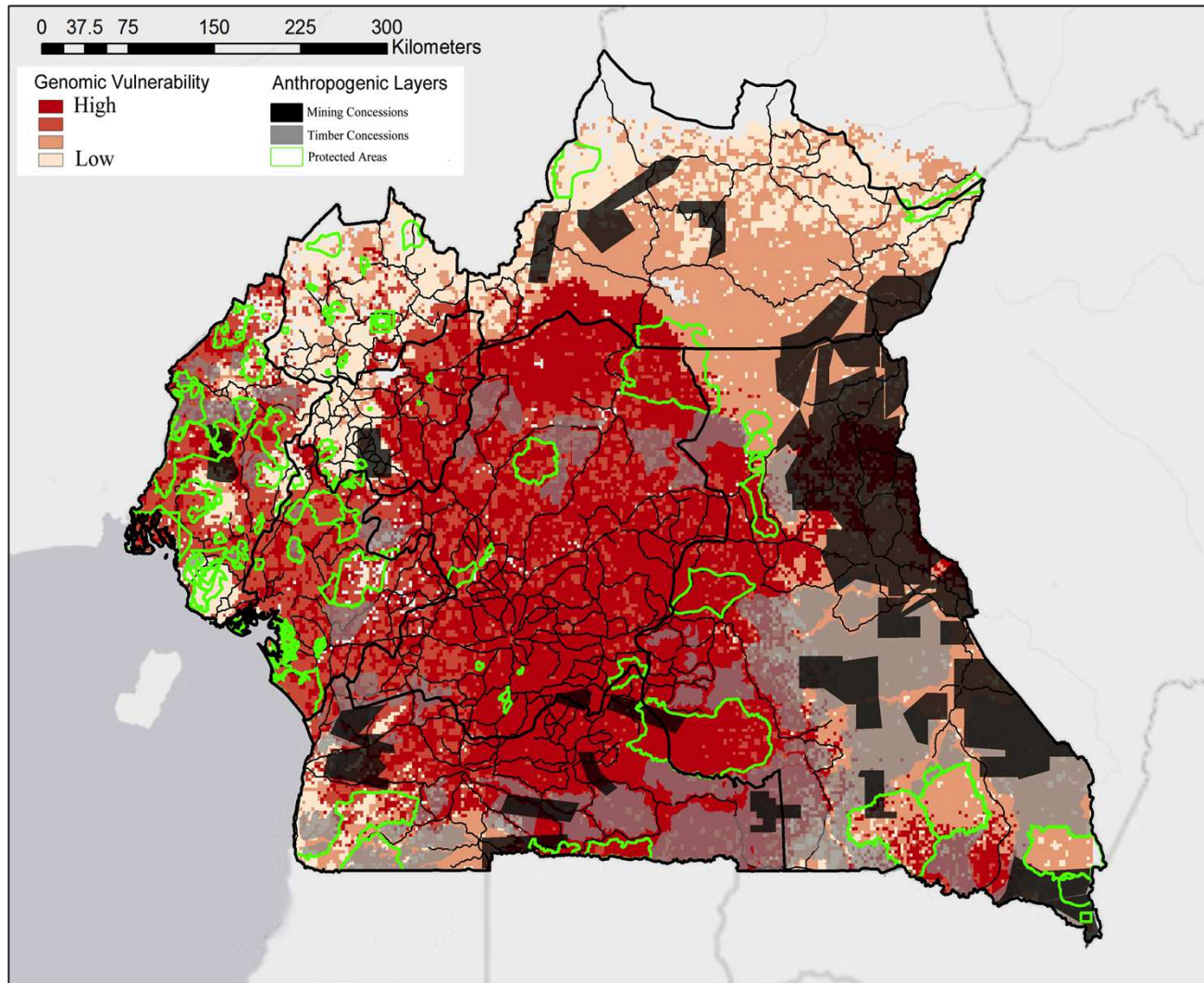


Smith et al. 2020 Evolutionary Applications

# NEXT STEPS: Integrate data and map genomic vulnerability across diverse taxa

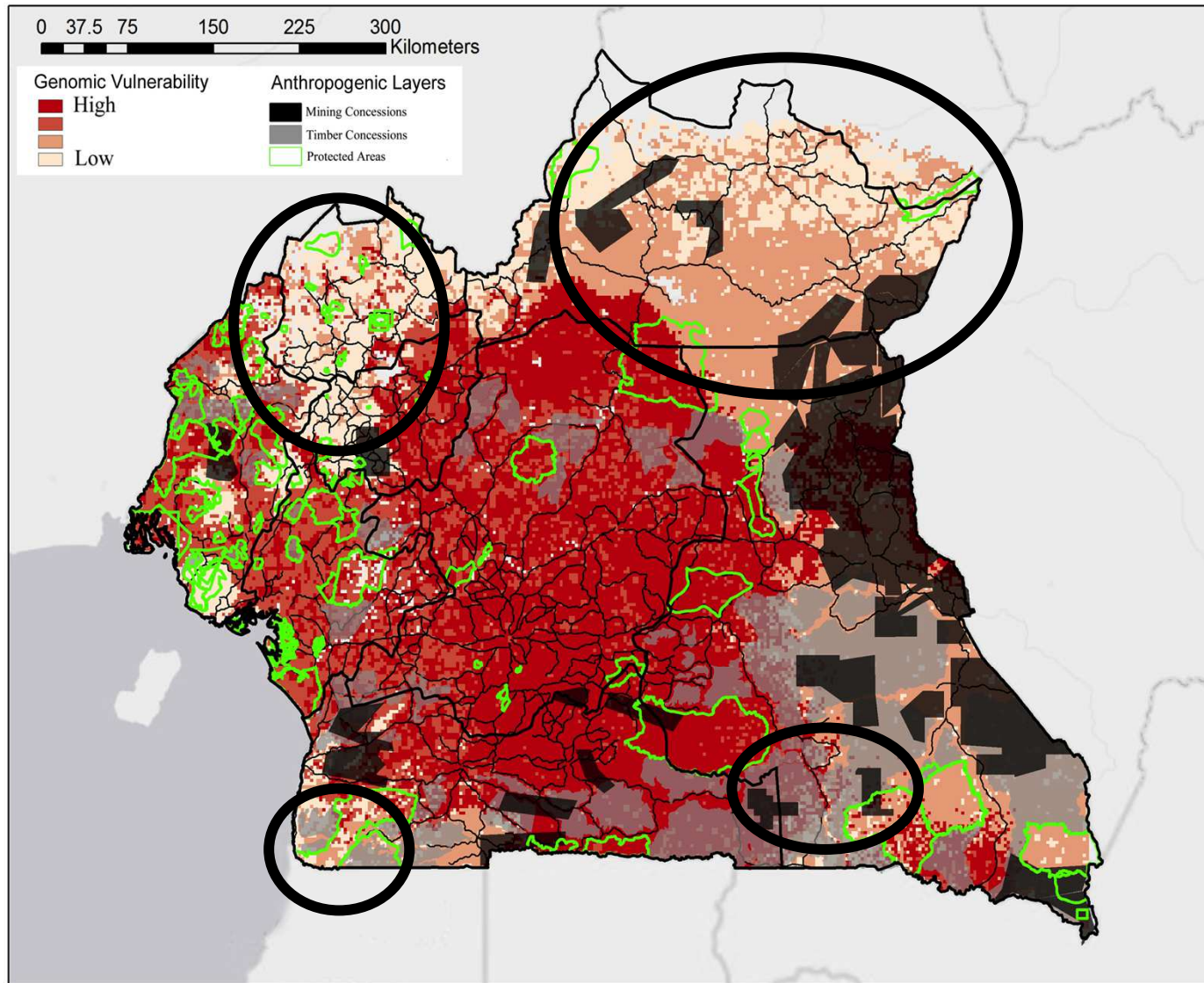


# Preliminary multi- taxa genomic vulnerability under future climate change



- Model was projected forward to 2080 (RCP 4.5)
- To persist in the bright red areas 50 years from now will need them to evolve at a rate 300 times faster than they have done since the last glacial maximum.

# Preliminary gap analysis under future climate change



- Priority areas for protection under future climate change



# Thanks to collaborators



# Thanks to funders



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WHERE DISCOVERIES BEGIN



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and Space Administration

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
National Institutes of Health



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