

# Projecting Future Ecosystem Carbon Balance in the Hawaiian Islands

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# Carbon Assessment of Hawaii

Released May of 2017

Part of nationwide assessment



## Baseline and Projected Future Carbon Storage and Carbon Fluxes in Ecosystems of Hawai'i



Professional Paper 1834

Department of the Interior  
U.S. Geological Survey

<https://doi.org/10.3133/pp1834>

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One scenario for future climate, land use, fire



## Baseline and Projected Future Carbon Storage and Carbon Fluxes in Ecosystems of Hawai'i

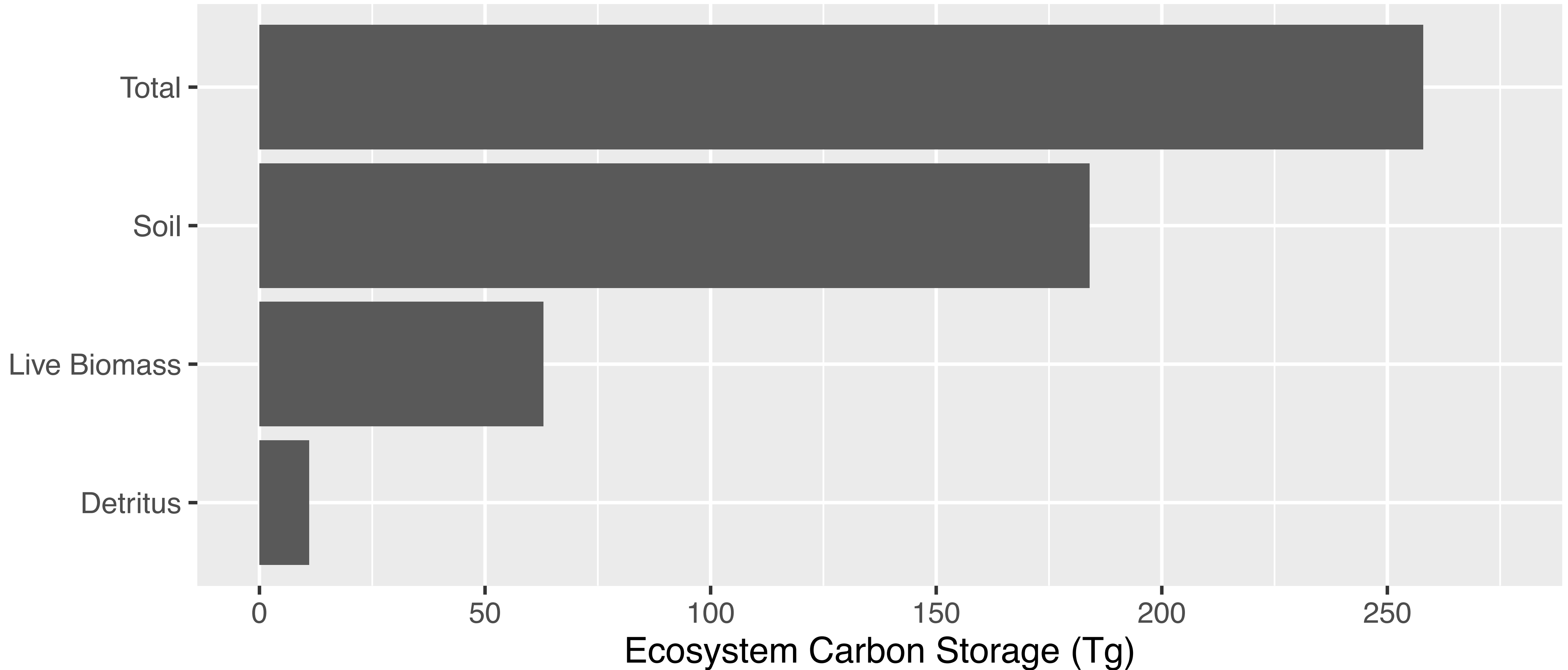


Professional Paper 1834

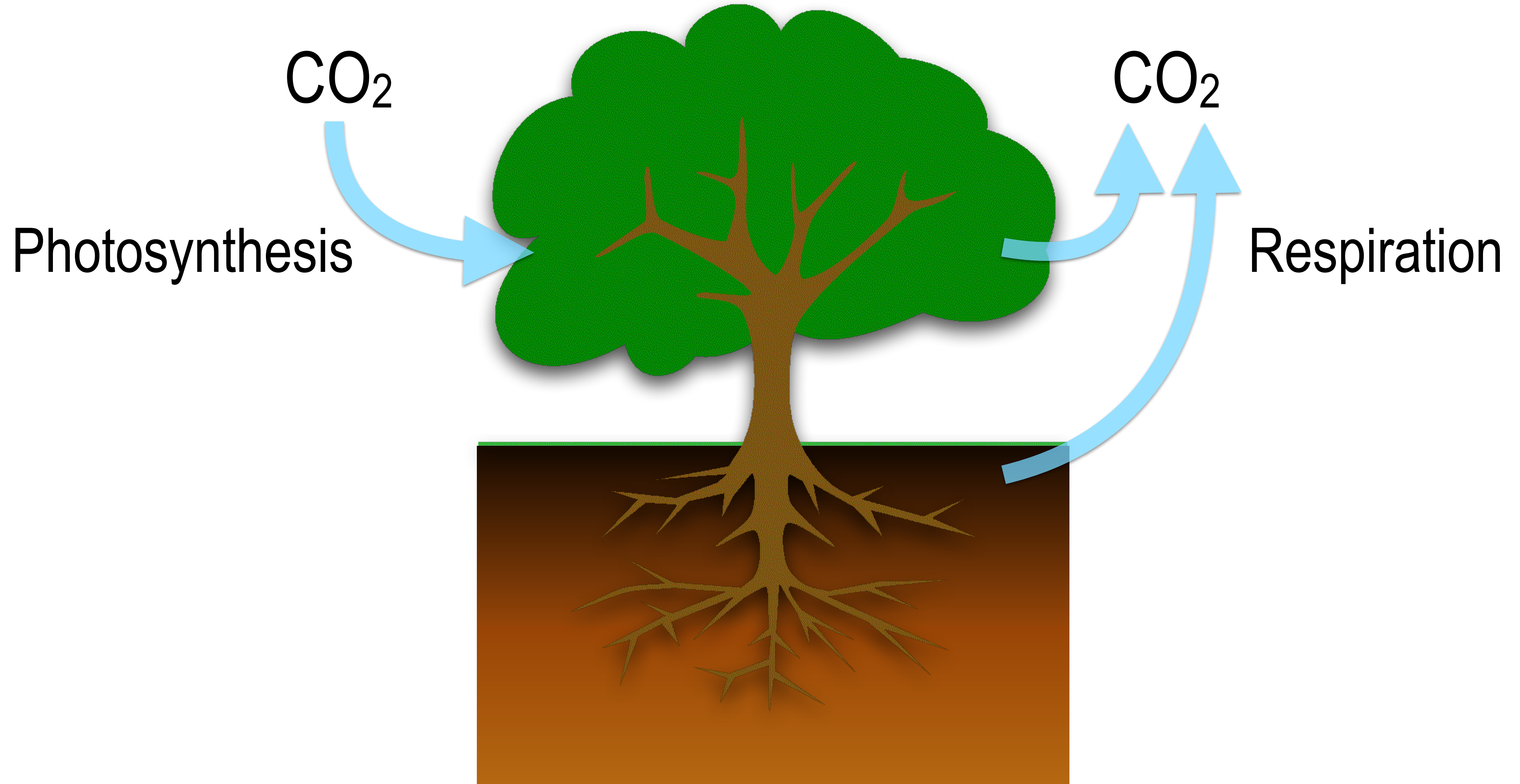
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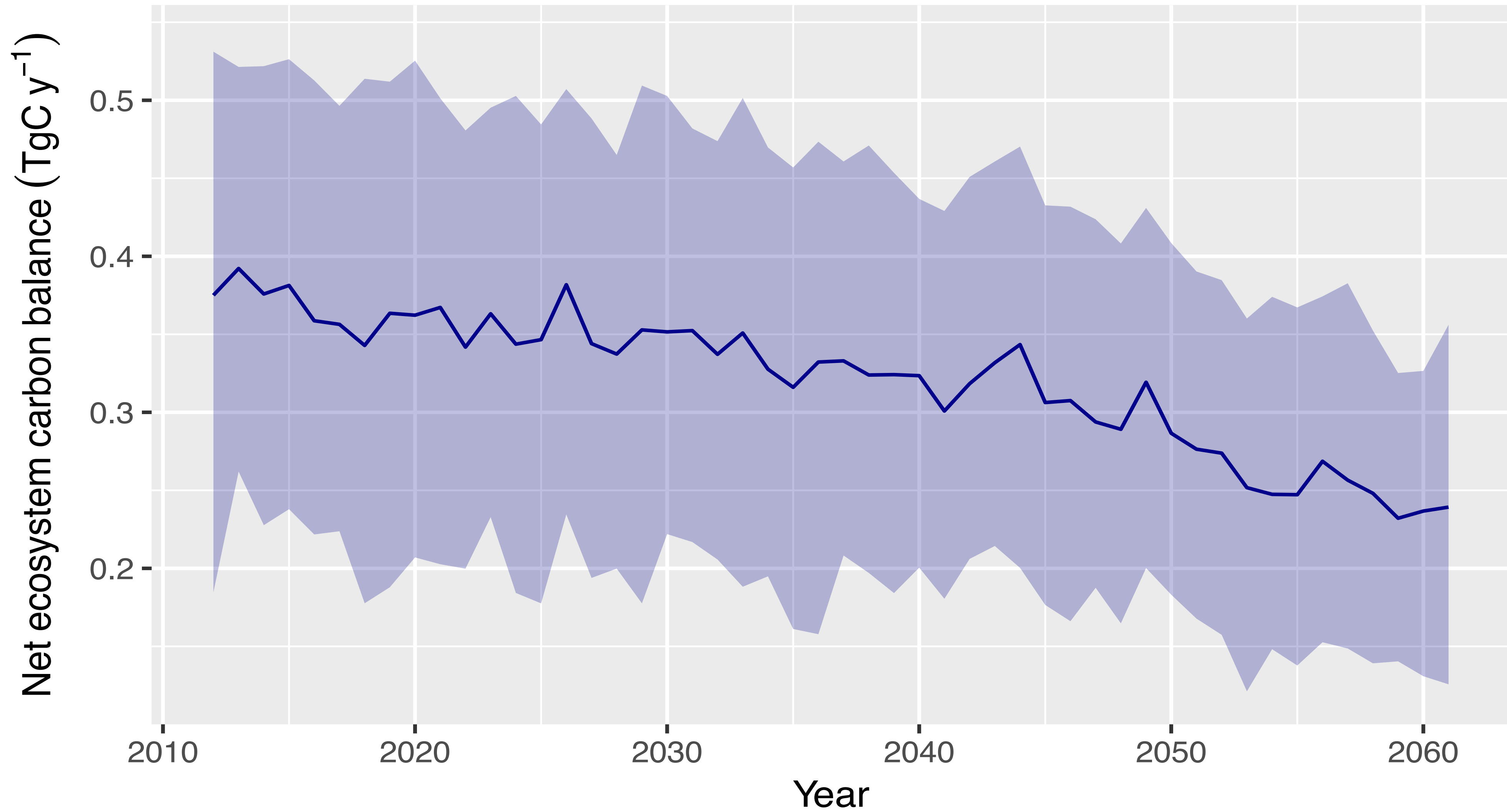
# Baseline ecosystem carbon storage in Hawaii



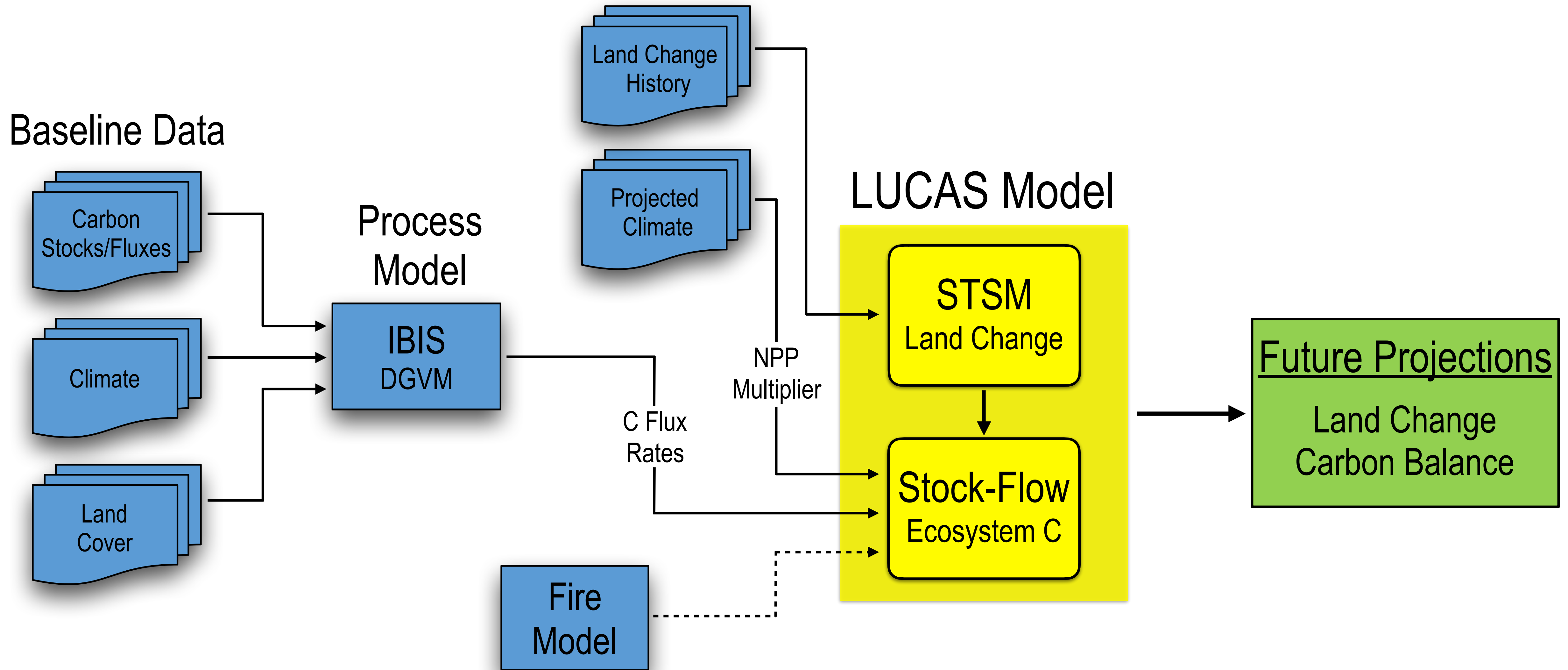
# Ecosystem Carbon Balance



# Ecosystem carbon balance projected to decline by ~35%



# Projecting Future Ecosystem Carbon Balance

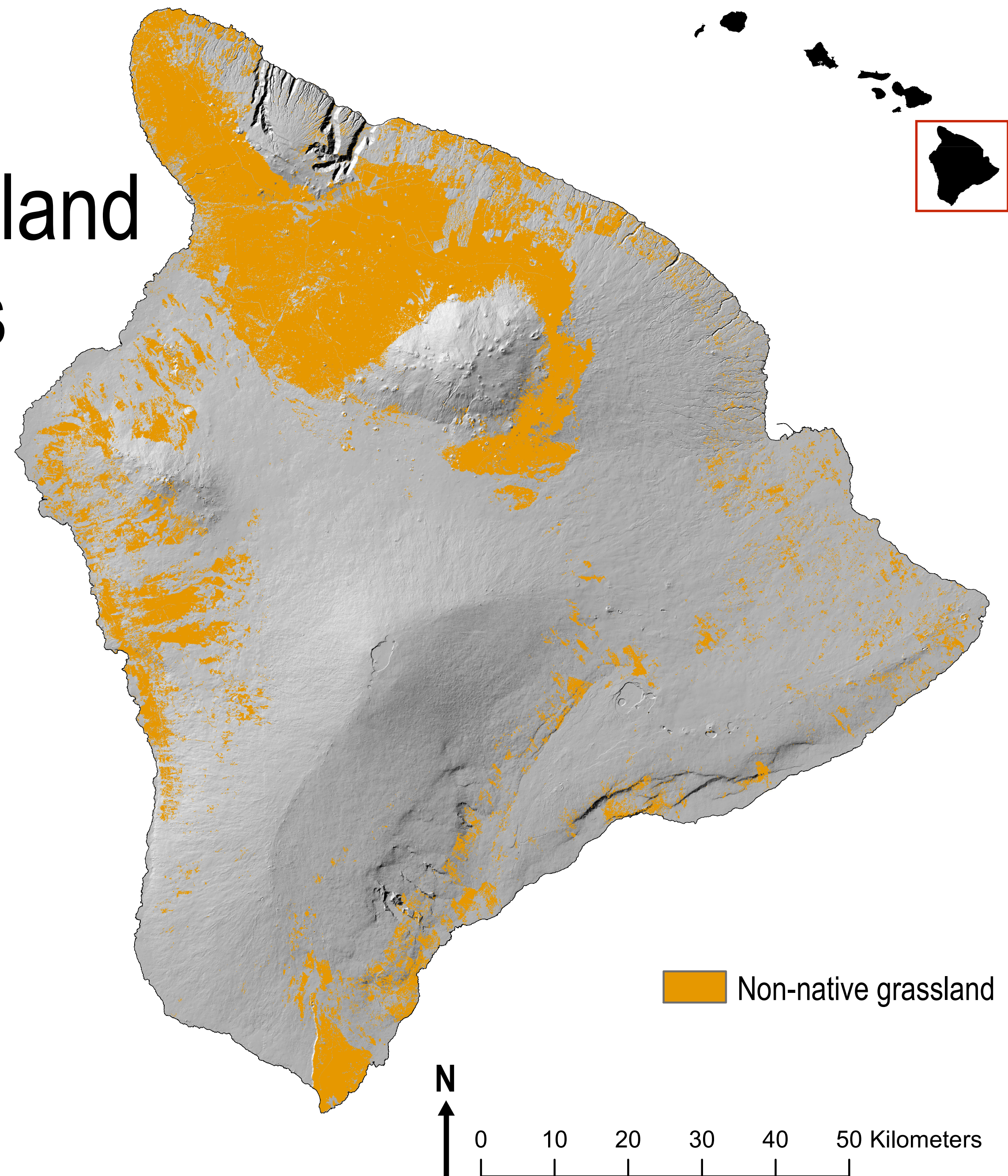


# Koa Reforestation Scenario

- Plant 25 km<sup>2</sup>/year for 21 years
- Tree density: 100,000 trees/km<sup>2</sup>
- Total cost: \$311M (\$593k/km<sup>2</sup>)



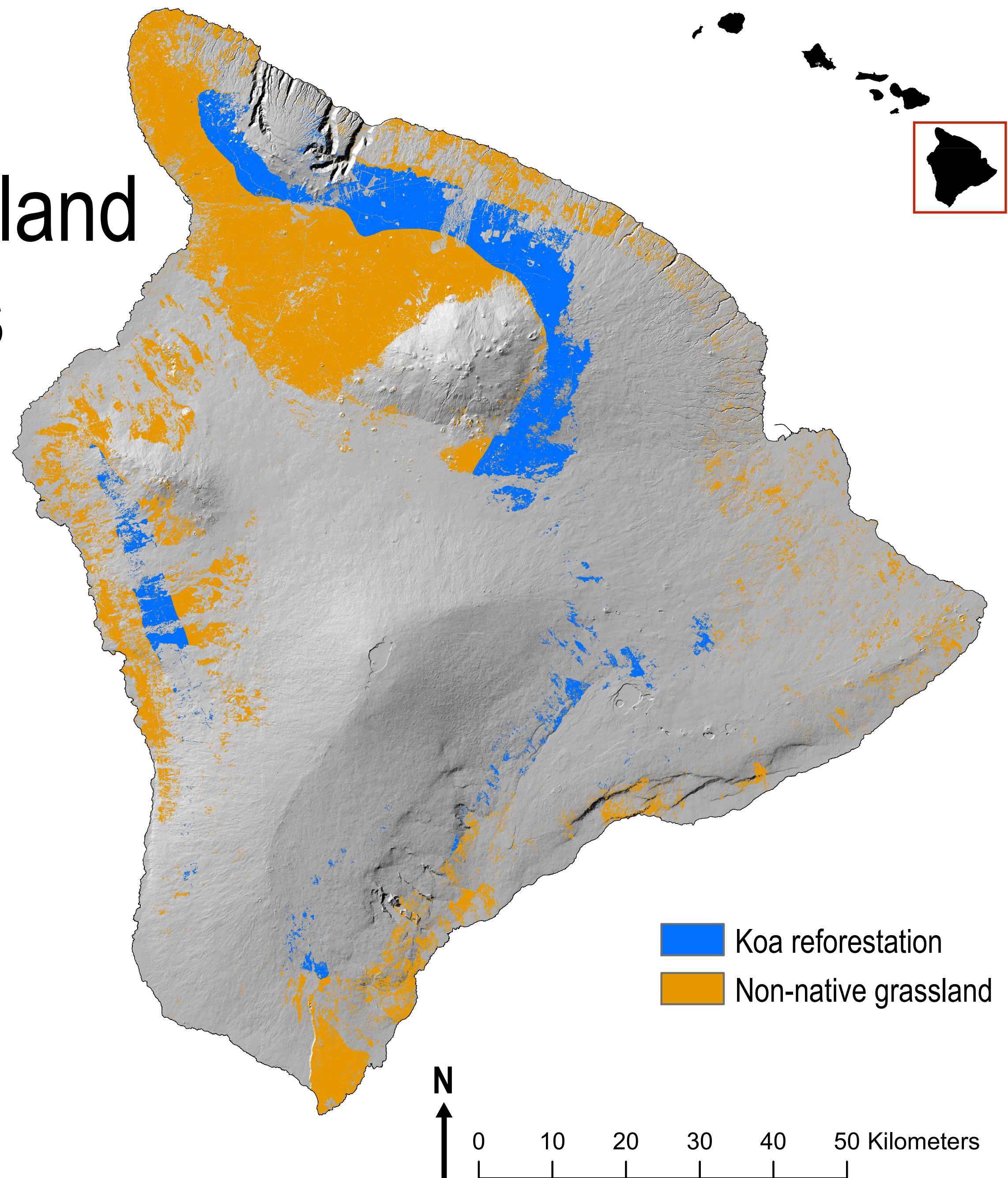
# Reforesting grassland with koa trees



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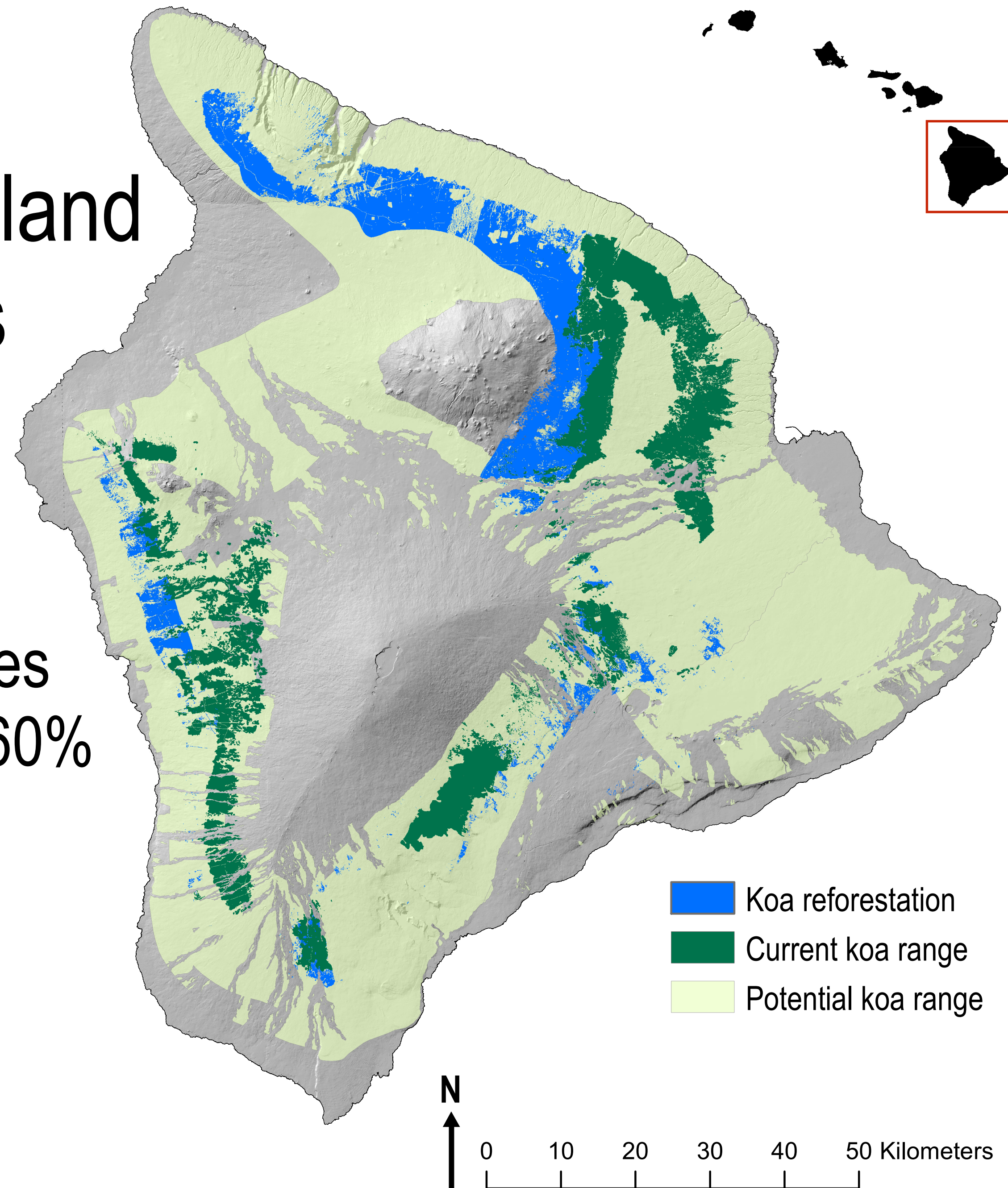
>750 m elevation

>1,000 mm rainfall

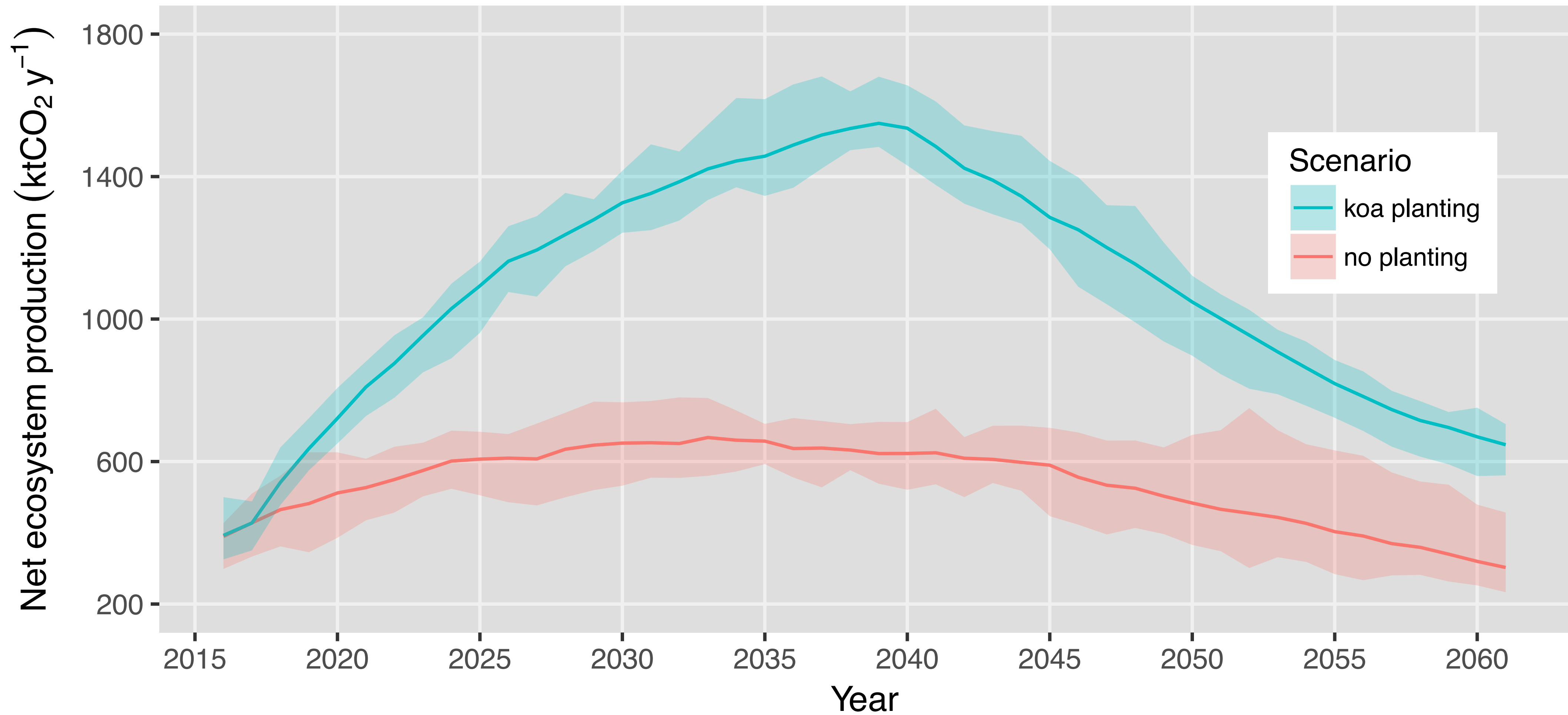


# Reforesting grassland with koa trees

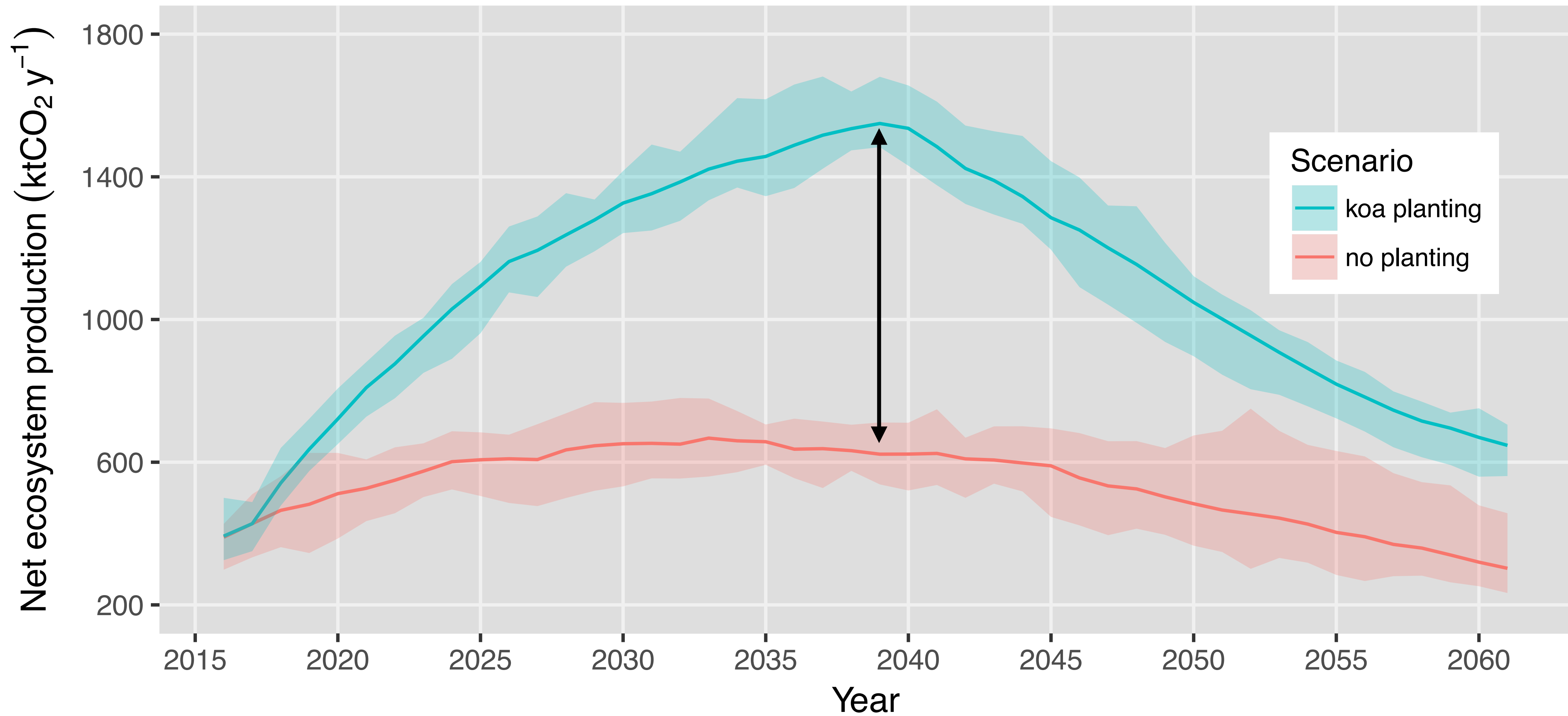
Reforestation increases  
current koa range by ~60%



# Koa reforestation increases carbon sequestration on Hawaii Island



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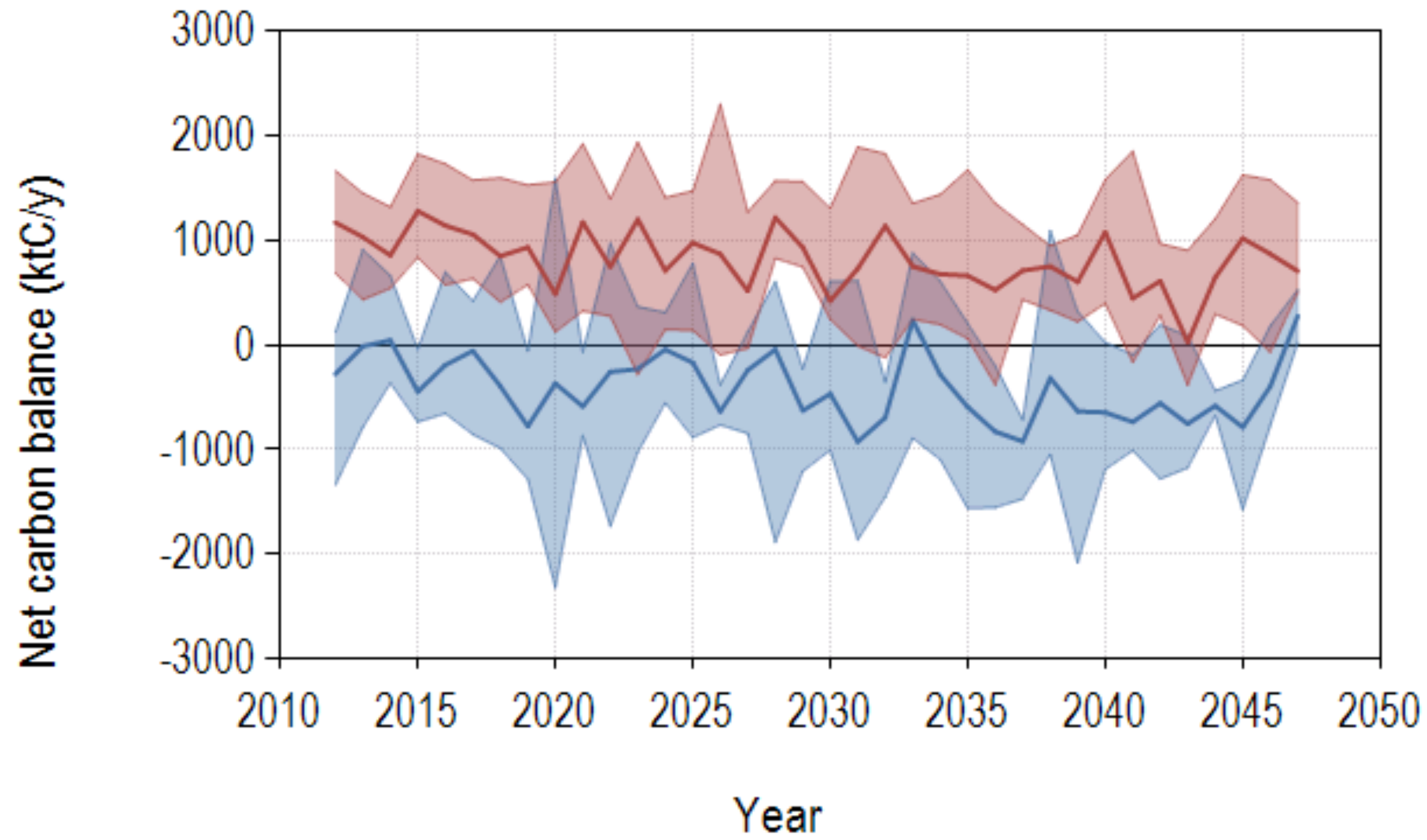
927,143 tons CO<sub>2</sub> = \$12,581,330.50

# New Land Use & Climate Change Scenarios

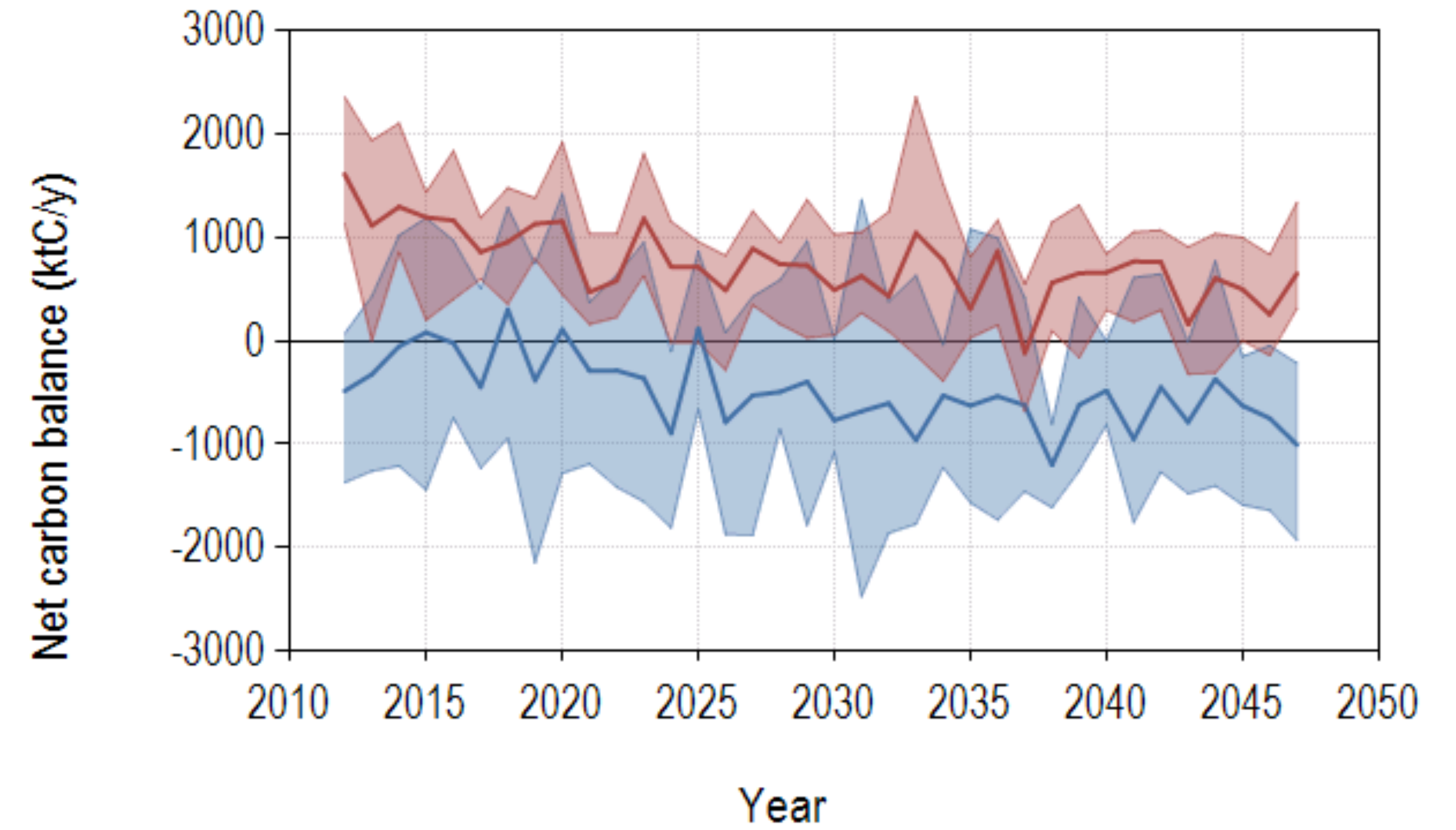
- High and low land change intensity
- Two climate warming pathways:  
RCP 4.5 & RCP 8.5

# Land use intensity can alter carbon balance more than climate

RCP 4.5



RCP 8.5



# Next Steps

- Incorporate ROD, afforestation statewide
- Develop fire model tied to climate change
- Refine land use change projections

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