



Unraveling the risks to forests under climate change

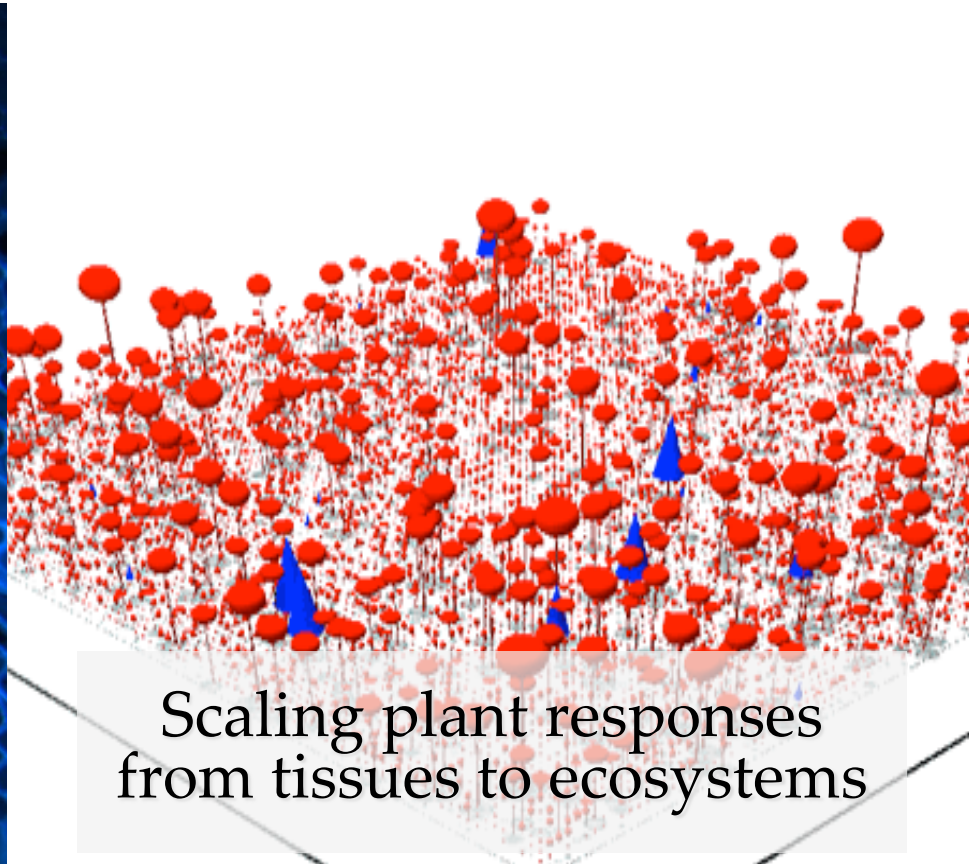
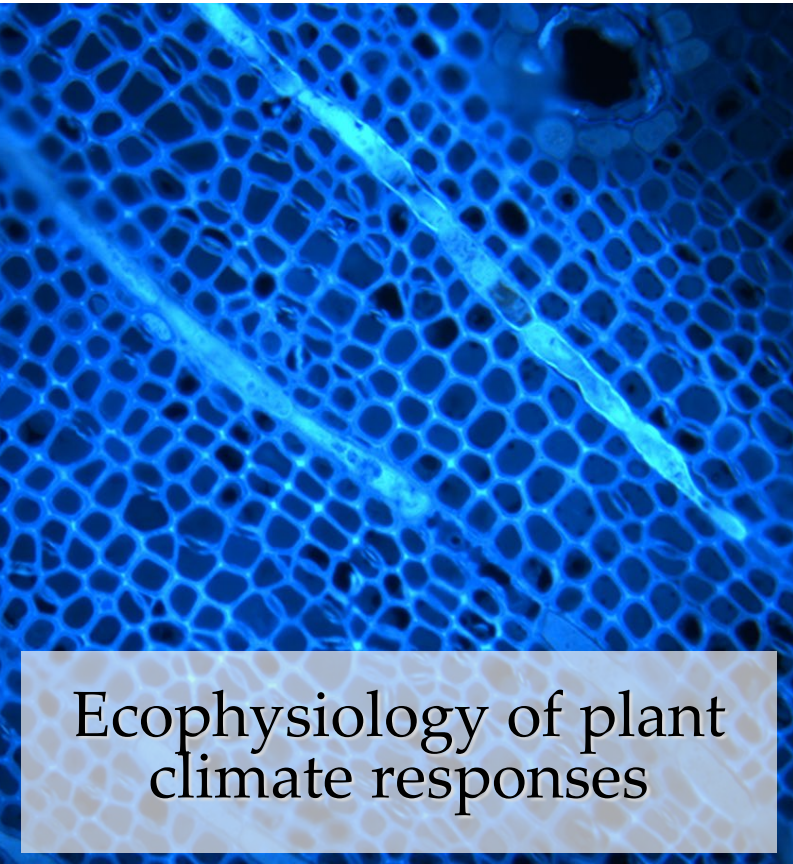
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What we do:



What are Nature-based Climate Solutions for forests?



Photo: David Giral

- **A broad set of strategies**
 - Avoided forest conversion
 - Reforestation/afforestation
 - Improved forest management
 - Improved plantations
 - Agroforestry
- **Often substantial co-benefits**
 - Biodiversity & habitat
 - Ecosystem services (e.g. water quality, pollination, tourism)
- **Enormous current interest from companies and governments**

How do we use forests' climate potential?

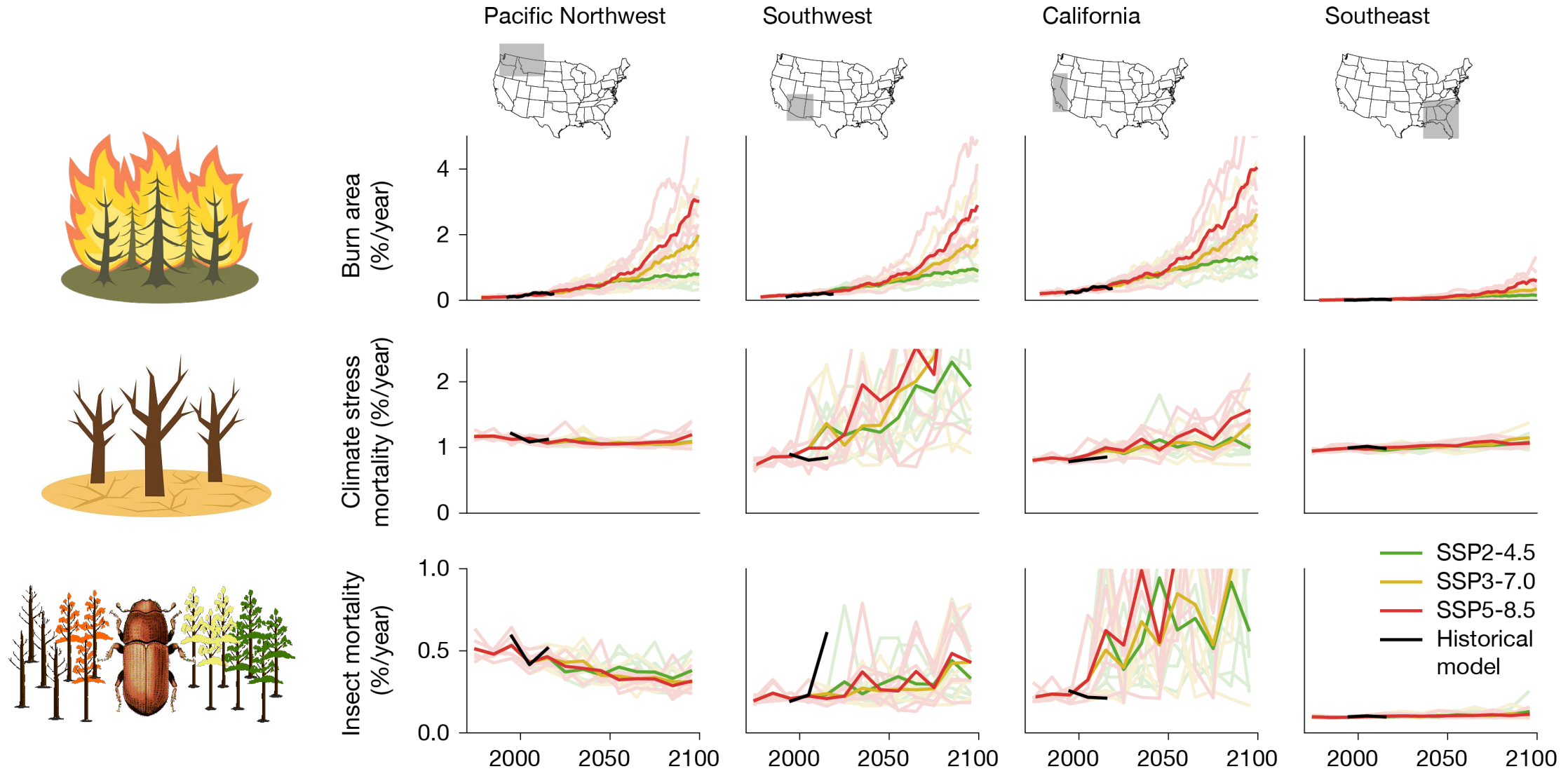
Generally, forest climate solutions projects must:

1. Cool the climate on net
2. Lead to 'additional' carbon storage
3. Account for shifting activities
4. Address risks to durability

There are currently enormous problems in existing carbon offset protocols in each of these four areas – an important science and policy issue

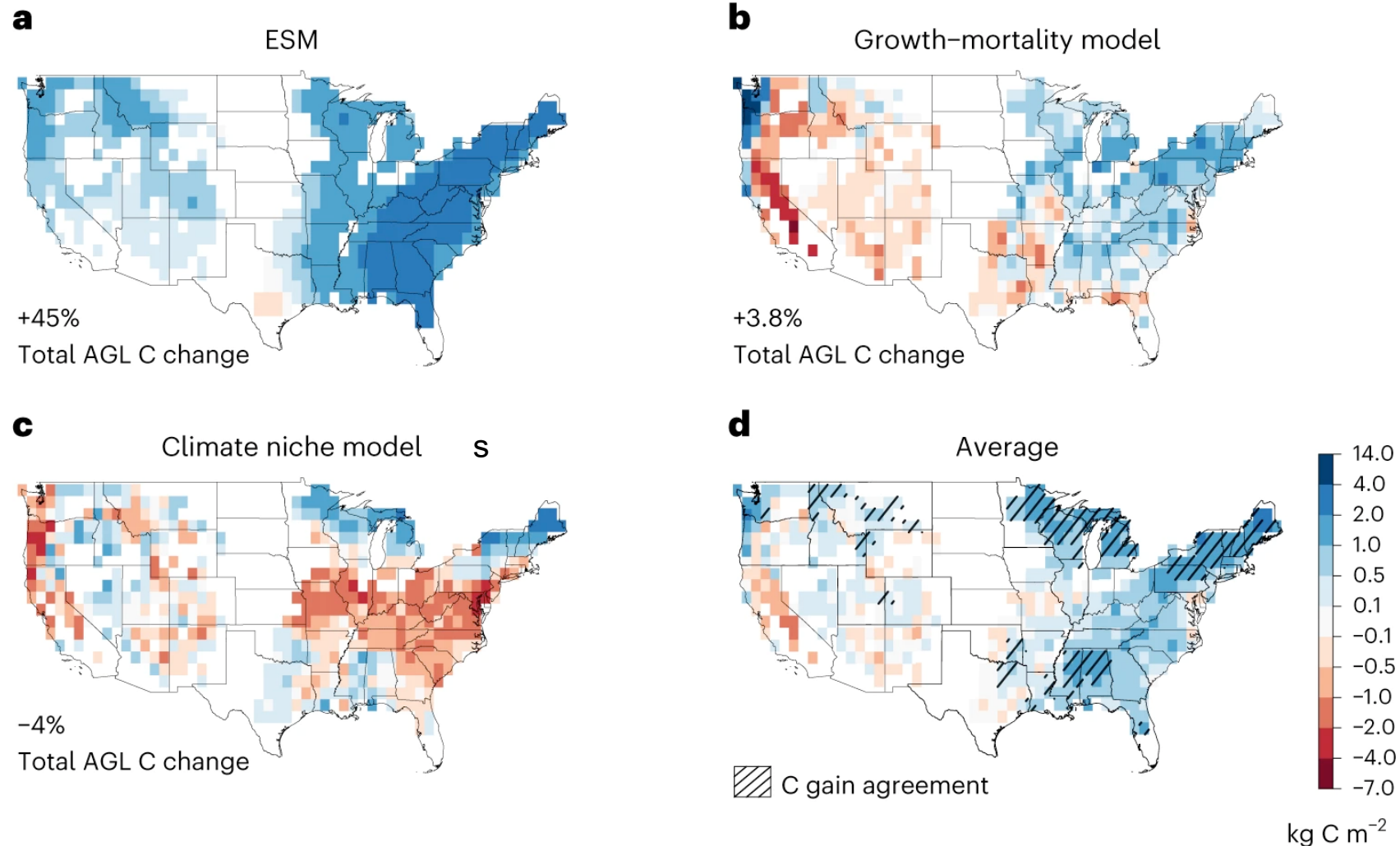


Future projected climate risks



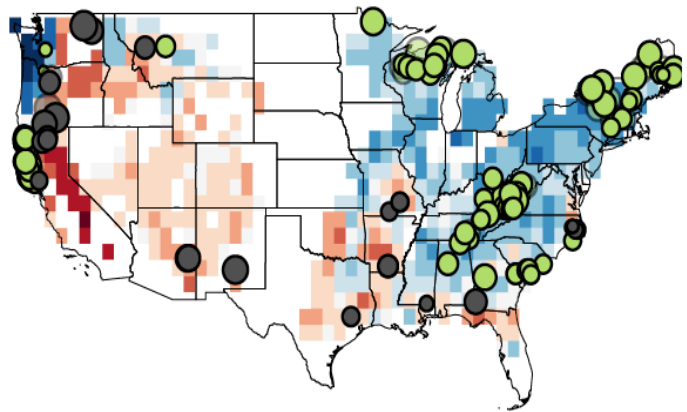
Is the future of US forests C gain or loss?

Large differences across current methods.

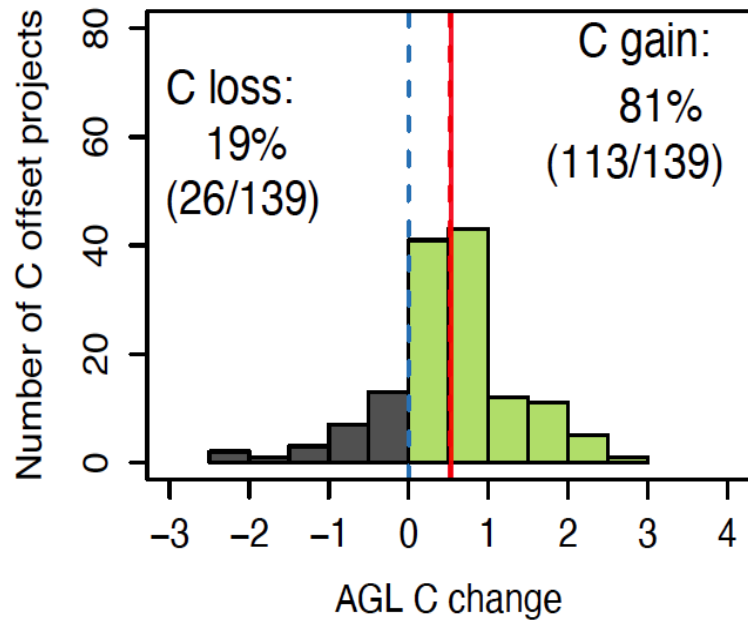


Current forest offset projects are at substantial risk of C losses even in SSP245

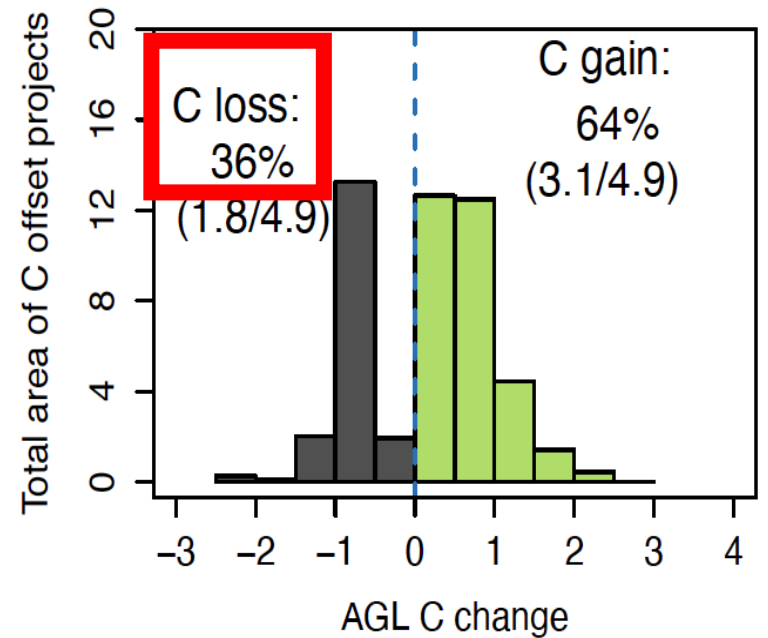
d Growth mortality model



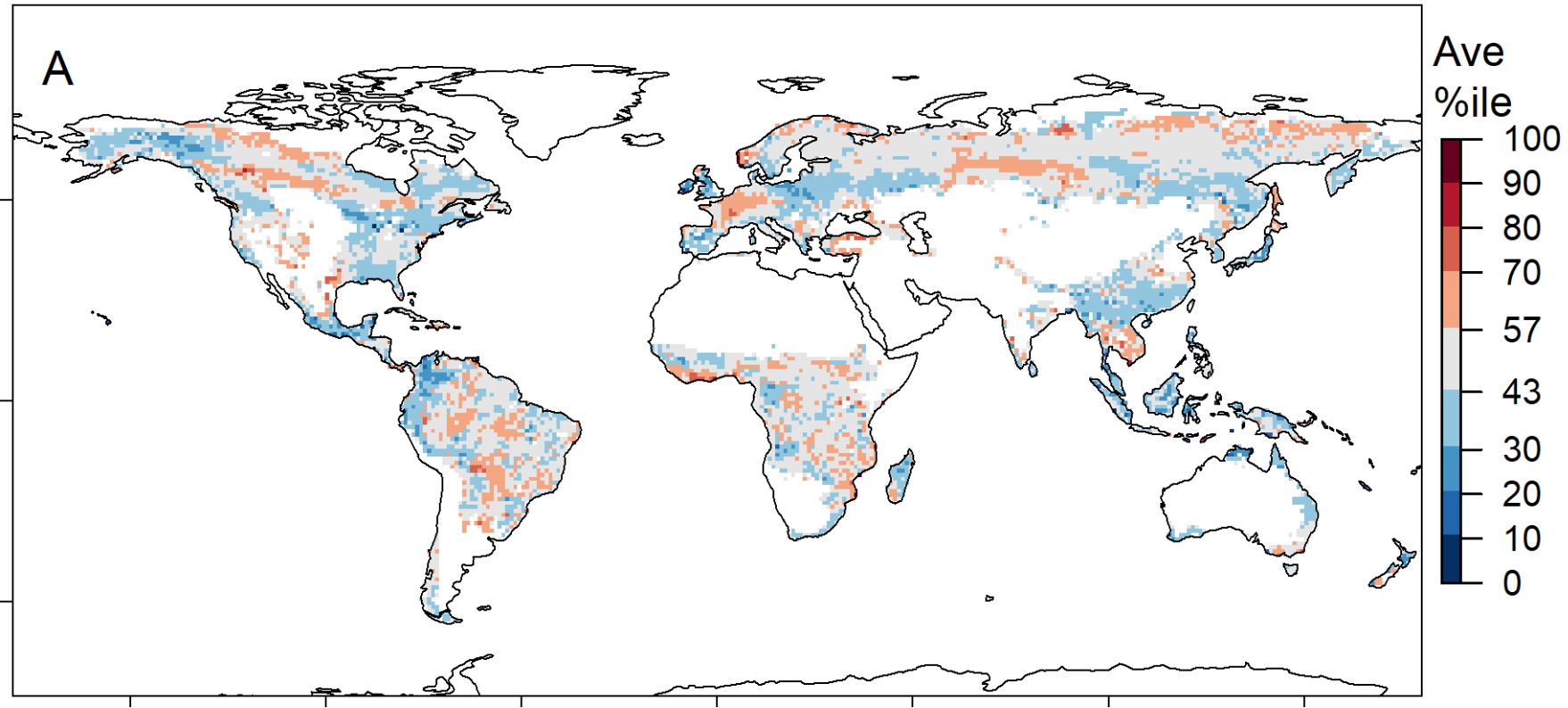
e Growth mortality model



f Growth mortality model



A global climate risk assessment of Earth's forests



Next step: We have leveraged satellite, ground plot, and ML methods to develop US and global reversal risk and buffer pool sizes needed for forest climate protocols/policies

Concluding thoughts

1. Interdisciplinary funding from government agencies (e.g. NSF) and foundations has been instrumental to this work.
2. Critical role of 'blue sky thinking' funding for taking risks.
3. Carving out the time for deep thinking and creativity is a challenge but crucial.
4. Increasing compliance time and costs of research are key challenges.
5. Open science is absolutely critical – large risk in climate/carbon space of much of models and data being developed in the private sector, limiting confidence, transparency, and accountability.

Thank you!



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Thank you!

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