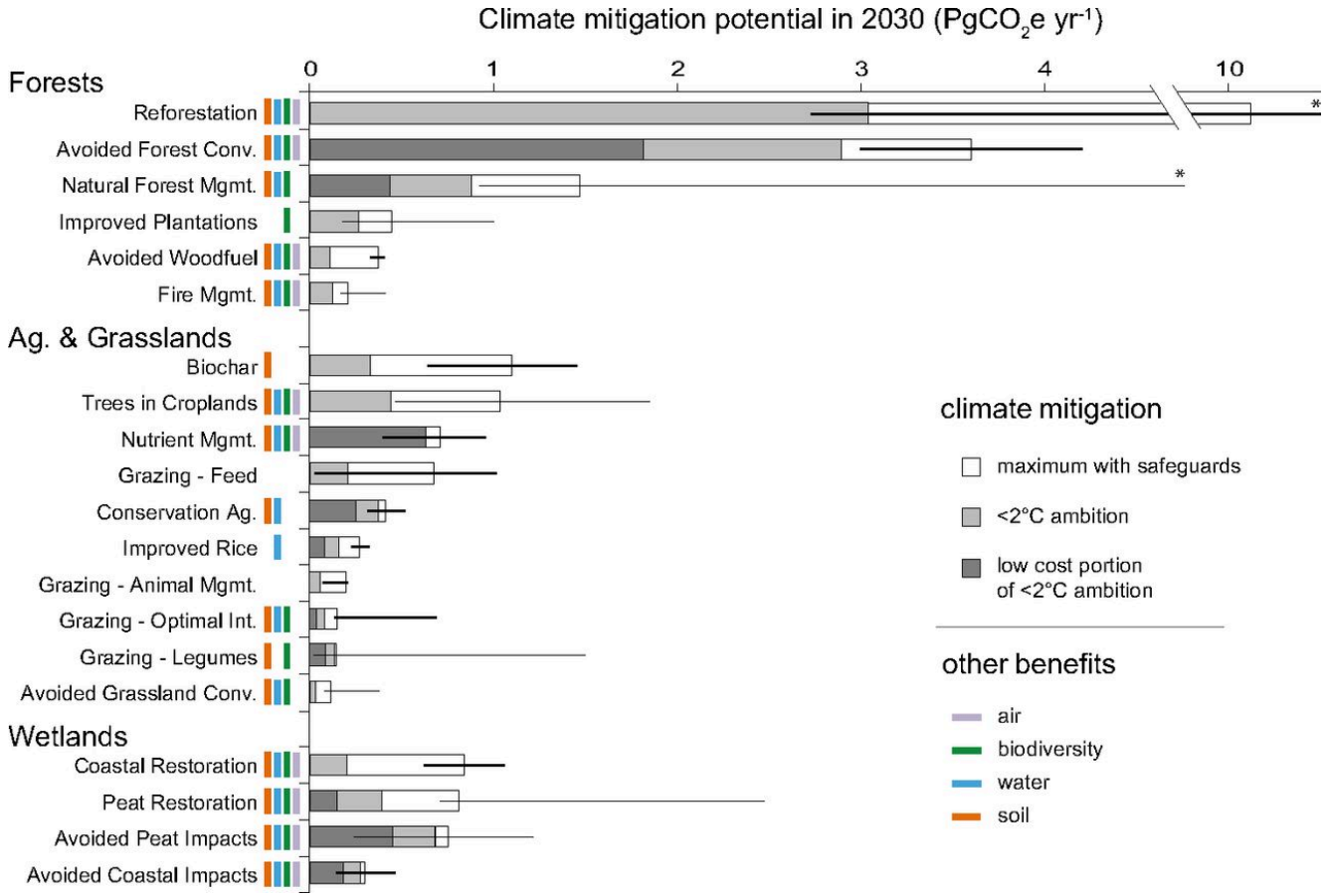
REFORESTATION AS A NATURAL CLIMATE SOLUTION

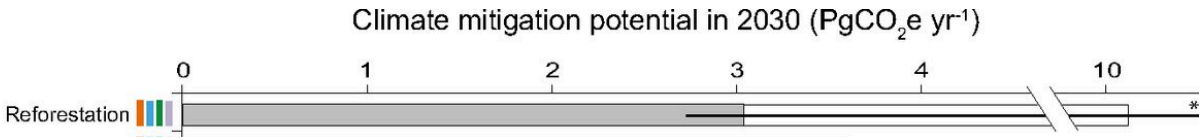
DR. SUSAN COOK-PATTON, SENIOR FOREST RESTORATION SCIENTIST
THE NATURE CONSERVANCY

REFORESTATION IS THE LARGEST OPPORTUNITY



Griscom et al. 2017 PNAS

REFORESTATION IS THE LARGEST OPPORTUNITY

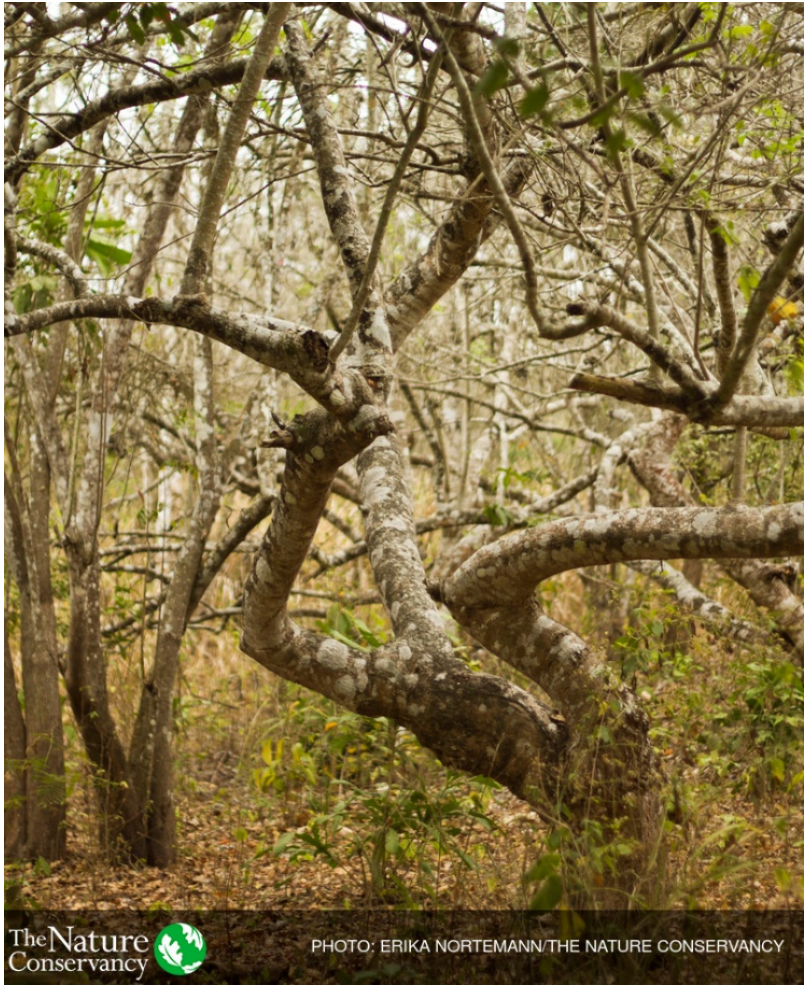


2.7 PgCO2/yr — 17.9 PgCO2/yr

Confidence range is 50% greater than estimate

Griscom et al. 2017 PNAS

MITIGATION DEPENDS ON **LOCATION**

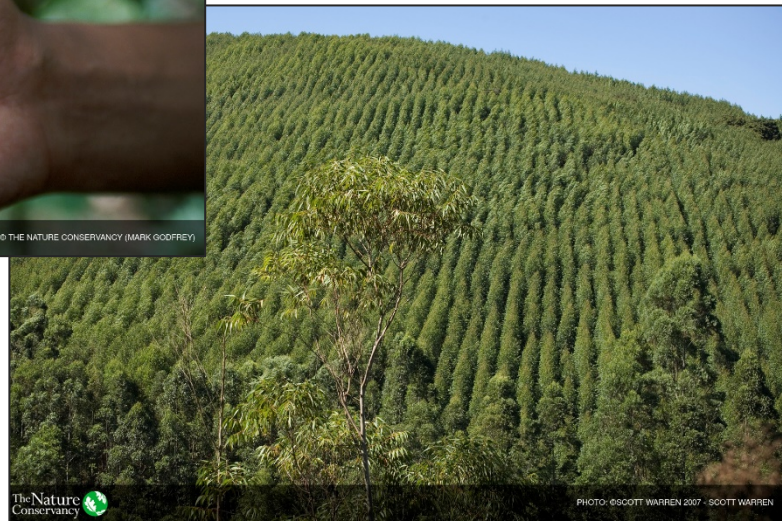


MITIGATION DEPENDS ON **APPROACH**

Natural forest regrowth
Assisted regeneration
Active restoration

Intensive tree monocrops
Multistrata systems
Tree intercropping
Silvopasture

Monoculture plantations
Mixed species plantations
Transitional land use

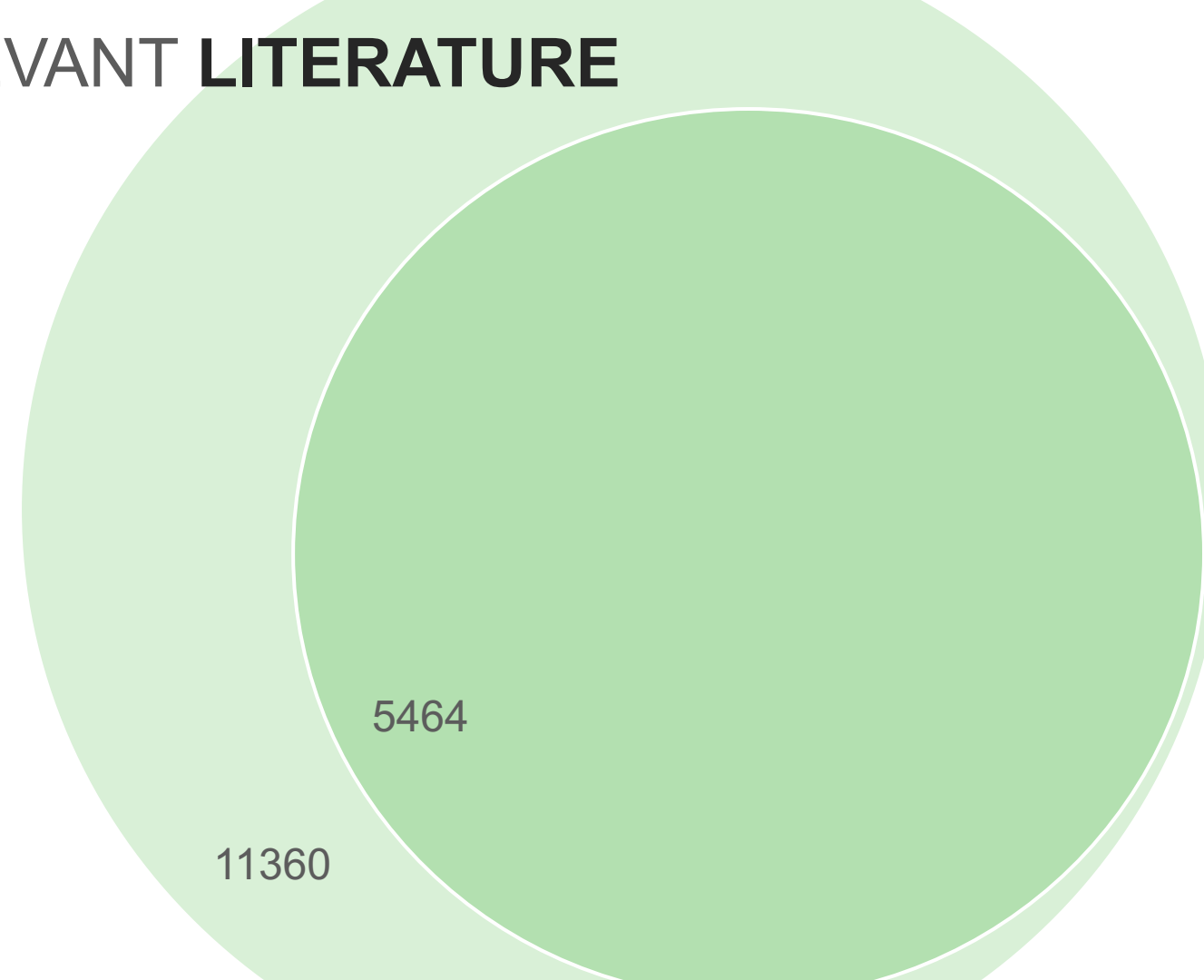


FIND THE RELEVANT RATE **LITERATURE**

FIND THE RELEVANT **LITERATURE**

11360

FIND THE RELEVANT **LITERATURE**



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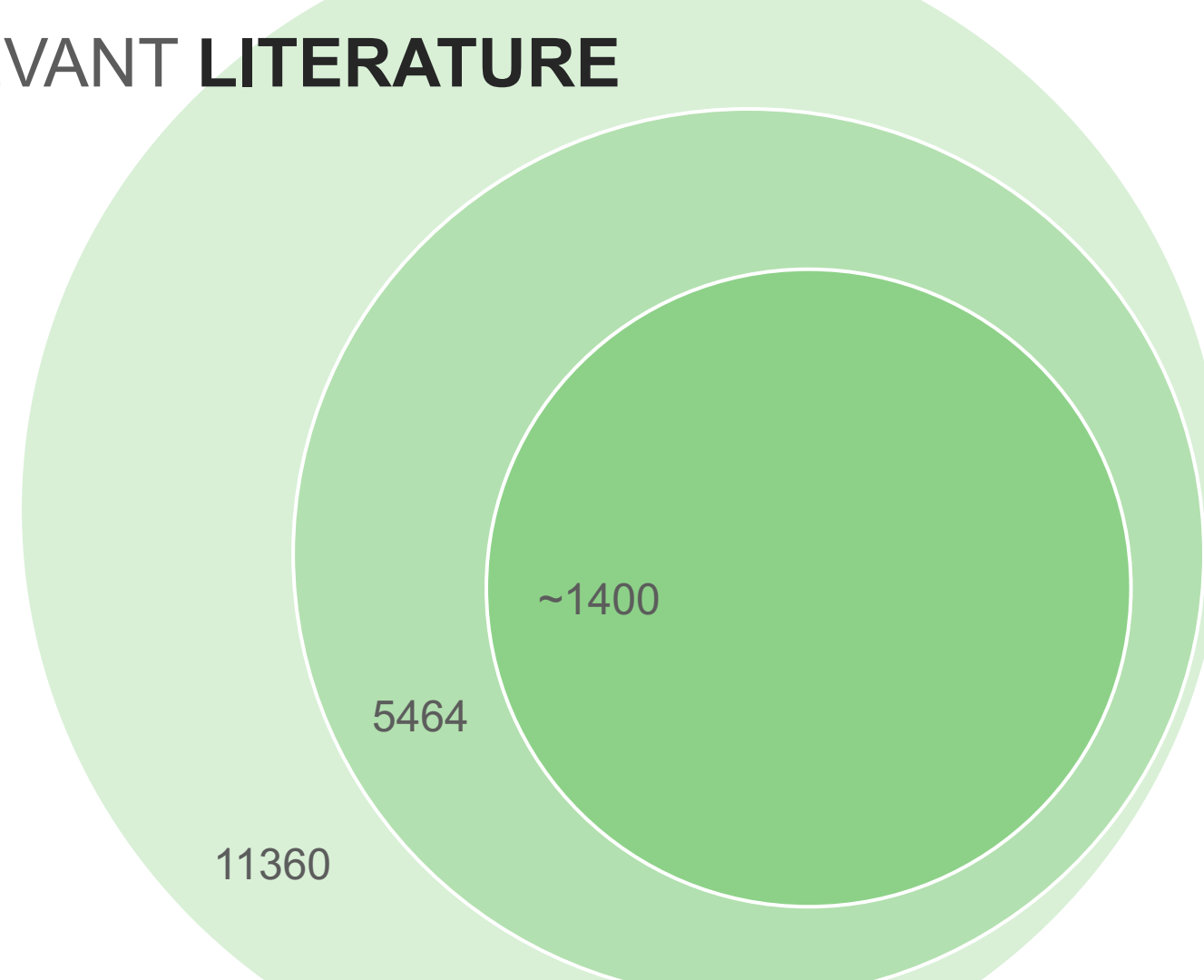

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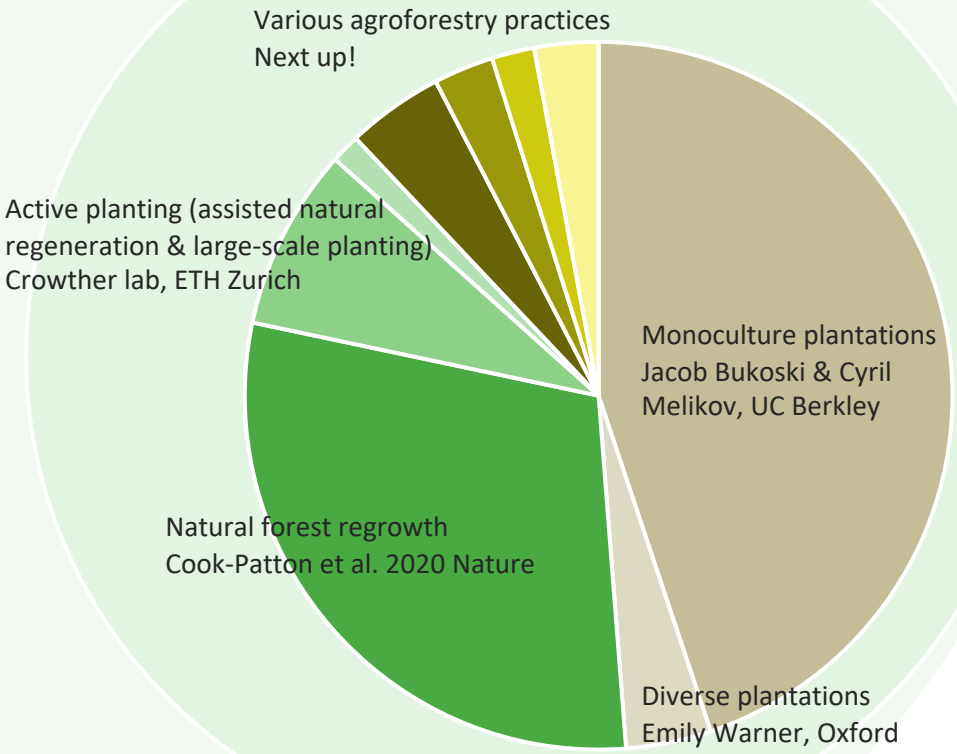


NATURAL FOREST REGROWTH =

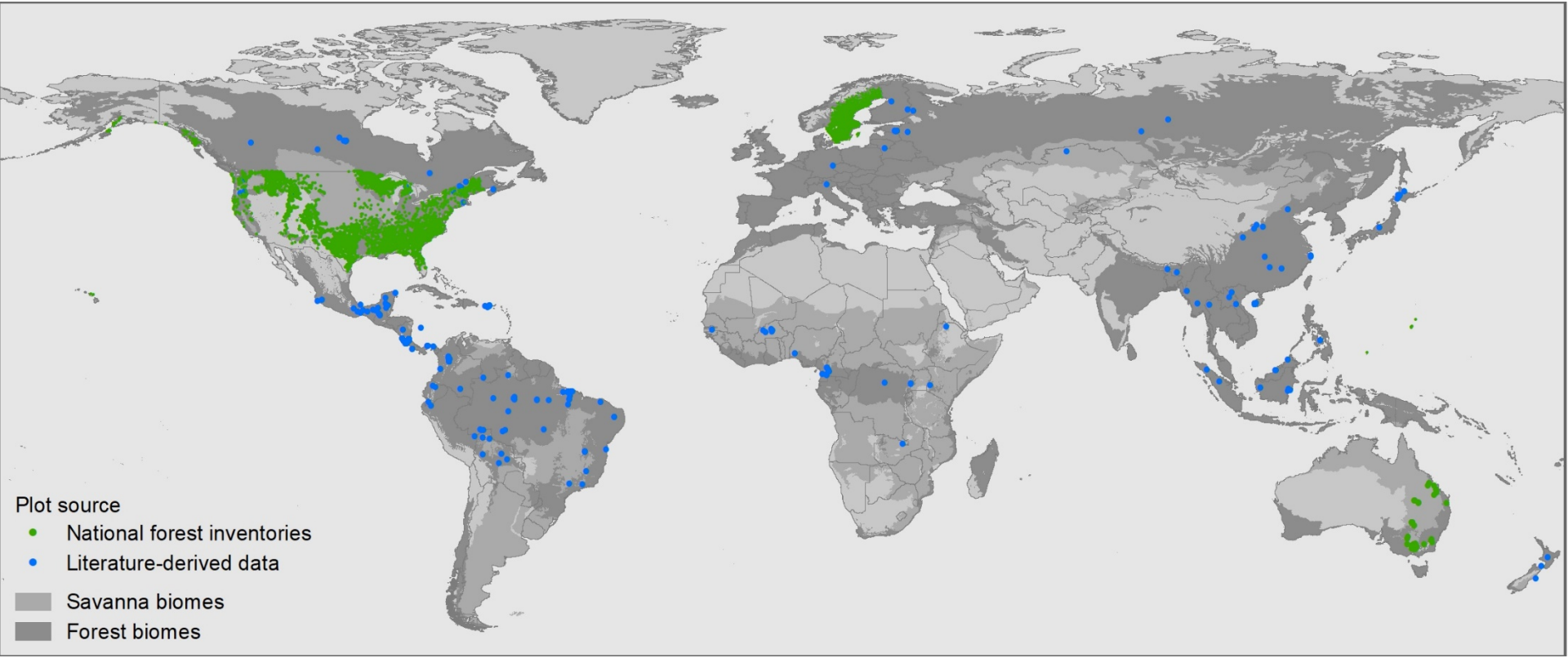
the recovery of forest cover on cleared lands through spontaneous regrowth after cessation of prior disturbance or land use

MAPPING CARBON ACCUMULATION POTENTIAL FROM **GLOBAL NATURAL FOREST REGROWTH**

31 authors Susan Cook-Patton, Sara Leavitt, David Gibbs, Nancy Harris, Kristine Lister, Krista Anderson-Teixeira, Russ Briggs, Robin Chazdon, Tom Crowther, Peter Ellis, Heather Griscom, Valentine Herrmann, Karen Holl, Skee Houghton, Cecilia Larrosa, Guy Lomax, Richard Lucas, Palle Madsen, Yadvinder Malhi, Alain Paquette, John Parker, Keryn Paul, Devin Routh, Stephen Roxburgh, Sassan Saatchi, Johan van den Hoogen, Wayne Walker, Charlotte Wheeler, Steve Wood, Liang Xu, Bronson Griscom

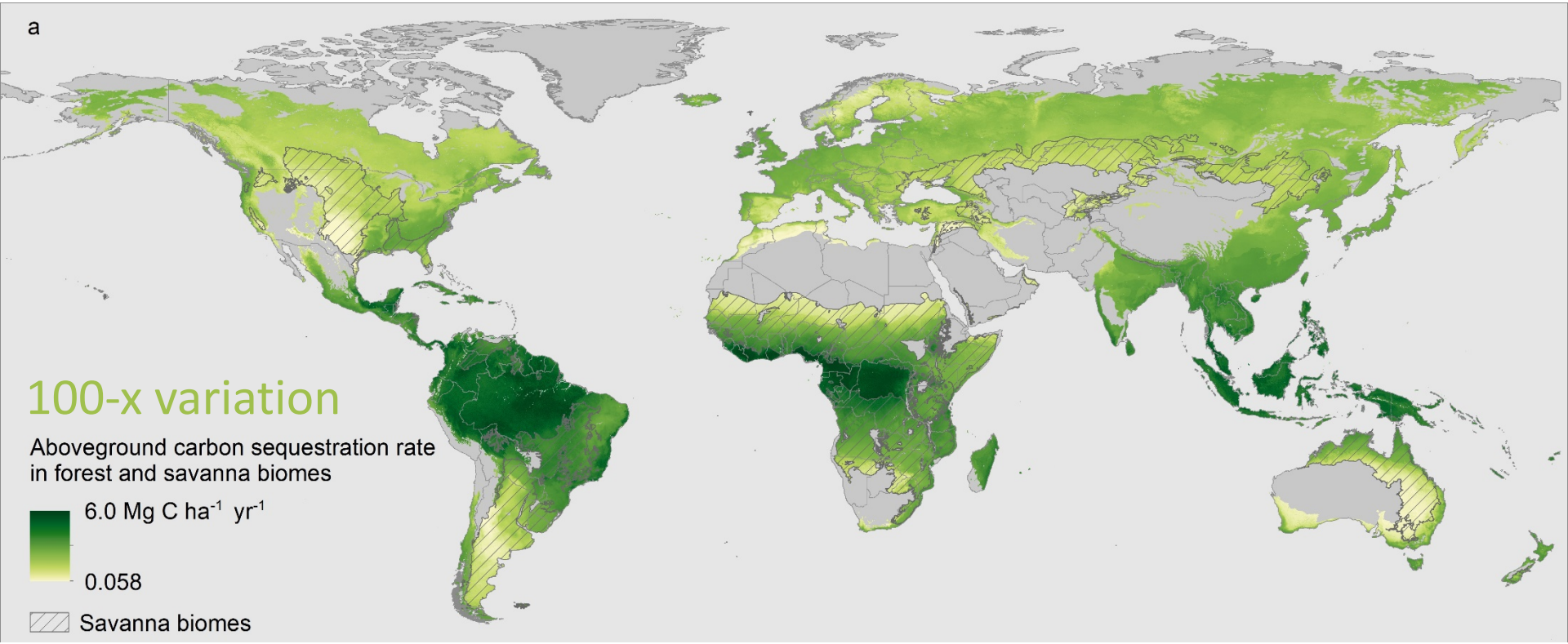
20 institutions TNC, Smithsonian, World Resources Institute, SUNY, University of Connecticut, University of the Sunshine Coast, ETH Zurich, James Madison University, UC Santa Cruz, Woods Hole Research Center, University of Oxford, University of Exeter, Aberystwyth University, InNovaSilva ApS, Université du Québec, CSIRO, NASA, University of Edinburgh, Yale, Conservation International

ABOVEGROUND FIELD DATA + 66 COVARIATES



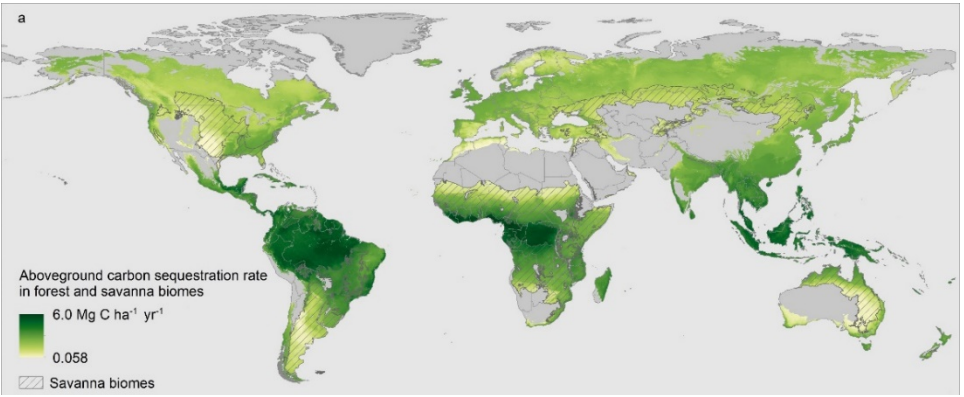
climate • soil nutrient/chemical/physical • radiation • topography • nitrogen deposition

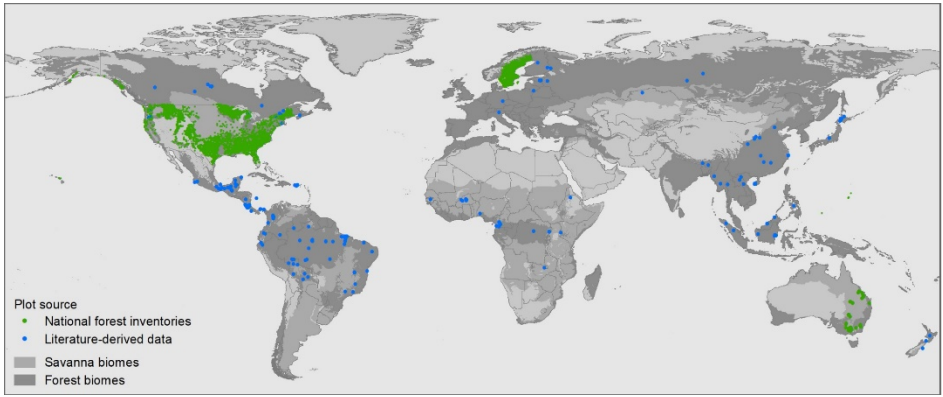
SPATIALLY-EXPLICIT ESTIMATES OF CARBON ACCUMULATION POTENTIAL IN FORESTS < 30 YRS

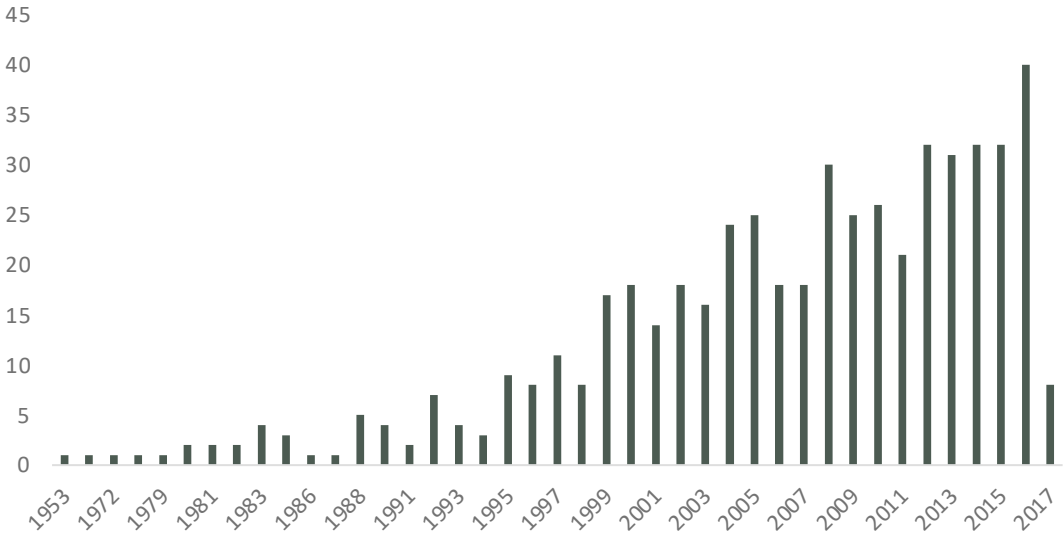


Cook-Patton et al. 2020 *in press*

1-km scale


a
Aboveground carbon sequestration rate in forest and savanna biomes
6.0 Mg C ha-1 yr-1
0.058
Savanna biomes


Plot source
National forest inventories
Literature-derived data
Savanna biomes
Forest biomes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2015
2017

Photo credit: Eamon Mac Mahon

Photo credit: Larry Moskovitz/TNC Photo Contest 2019

Restoration of forest cover is a tool

- not “the” tool
- with the potential for wise use or mis-use

Photo credit: Evan Amos

CHALLENGES:

- Limited or outdated data
- Future projections based on historial data
- Lack of reporting and monitoring on successes and failures
- Lack of consistent and reliable details about where restoration has occurred

THE THREE PILLARS OF DYNAMIC GLOBAL MONITORING

underpinning the success of forest cover restoration:

AGGREGATION OF RESTORATION PROJECTS

EXPERIMENTAL NETWORK RESTORATION & CONTROL PLOTS

ADVANCED REMOTE SENSING METHODS

Monitor progress towards large restoration goals

Adaptively learn what's working and what's not to scale successes

THE THREE PILLARS OF DYNAMIC GLOBAL MONITORING

underpinning the success of forest cover restoration:

AGGREGATION OF RESTORATION PROJECTS

EXPERIMENTAL NETWORK RESTORATION & CONTROL PLOTS

ADVANCED REMOTE SENSING METHODS

Test causes of project success or failure

THE THREE PILLARS OF DYNAMIC GLOBAL MONITORING

underpinning the success of forest cover restoration:

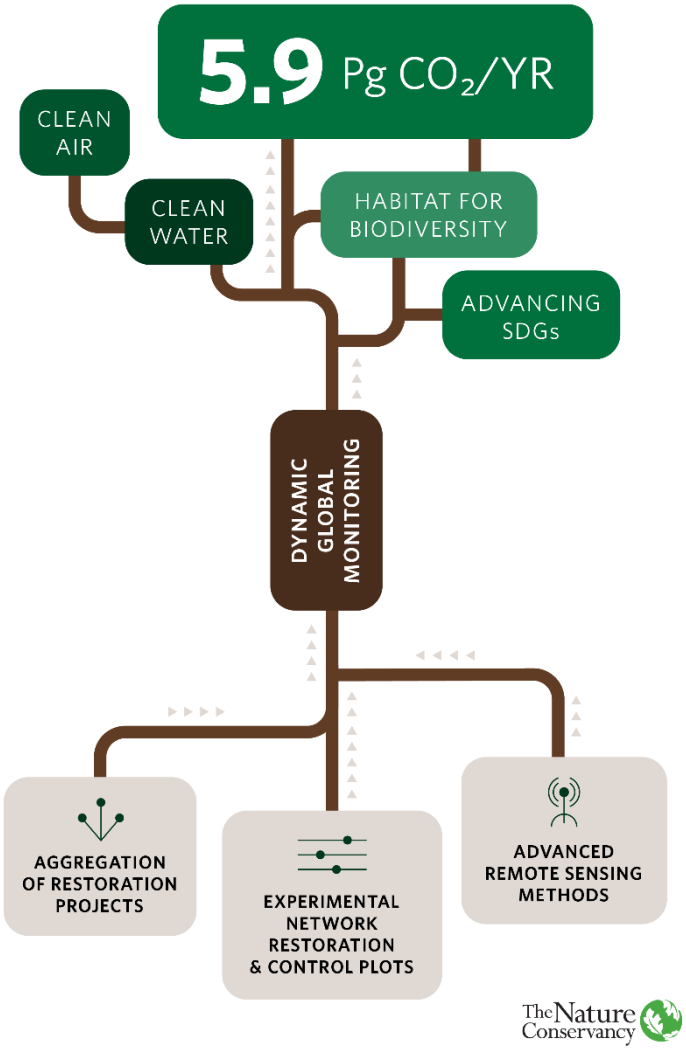
AGGREGATION OF RESTORATION PROJECTS

EXPERIMENTAL NETWORK RESTORATION & CONTROL PLOTS

ADVANCED REMOTE SENSING METHODS

Refine our estimates of potential (where & how much carbon)

Enable globally consistent and accessible monitoring



All three pillars are necessary

Each pillar enhances the others