

Creating Global Resiliency: The Ecological Case for Native Seeds



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Institute for
Applied Ecology



Thinking Globally



The Ecological Case for Native Seeds

The Challenge

Global Change

Native Plants and Ecosystem Services

Native Plants and Resilience

Genotypic Security

It Takes a Village: Developing Sustainable Native
Plant Strategies

The Challenge

Meeting the growing needs of humanity in a rapidly changing world.

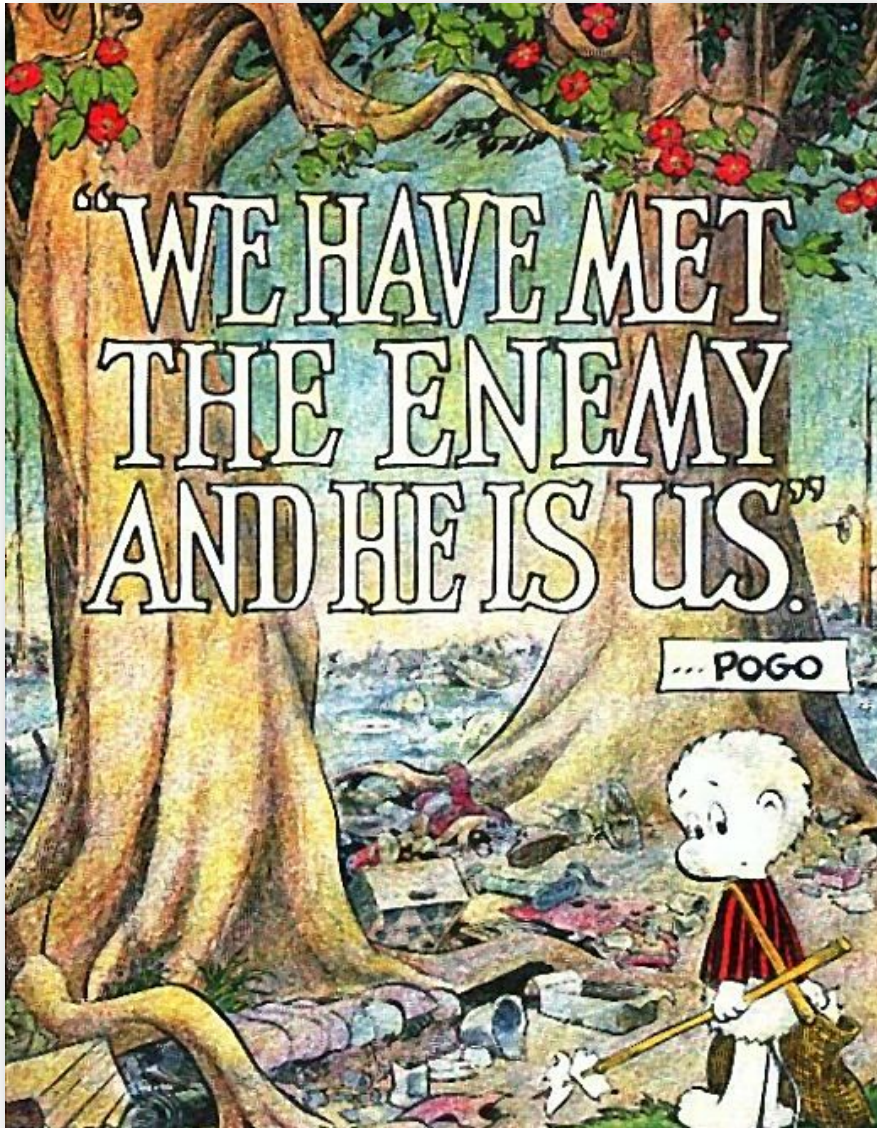
7 BILLION

How your world will change



**SUSTAINABLE
DEVELOPMENT
GOALS**

The Challenge



April 22, 1970

The First Earth Day
Poster by Ralph Kelly

The Challenge: UN Sustainable Development Goals

Sustainable Development Goals



UN SDGs: <https://sustainabledevelopment.un.org/>

25 September 2015

The Challenge: Stressors Affecting Native Plants Globally

- Large-scale disturbances
- Invasive plant species
- Altered wildfire regimes
- Habitat modification
- Land overuse
- Climate change



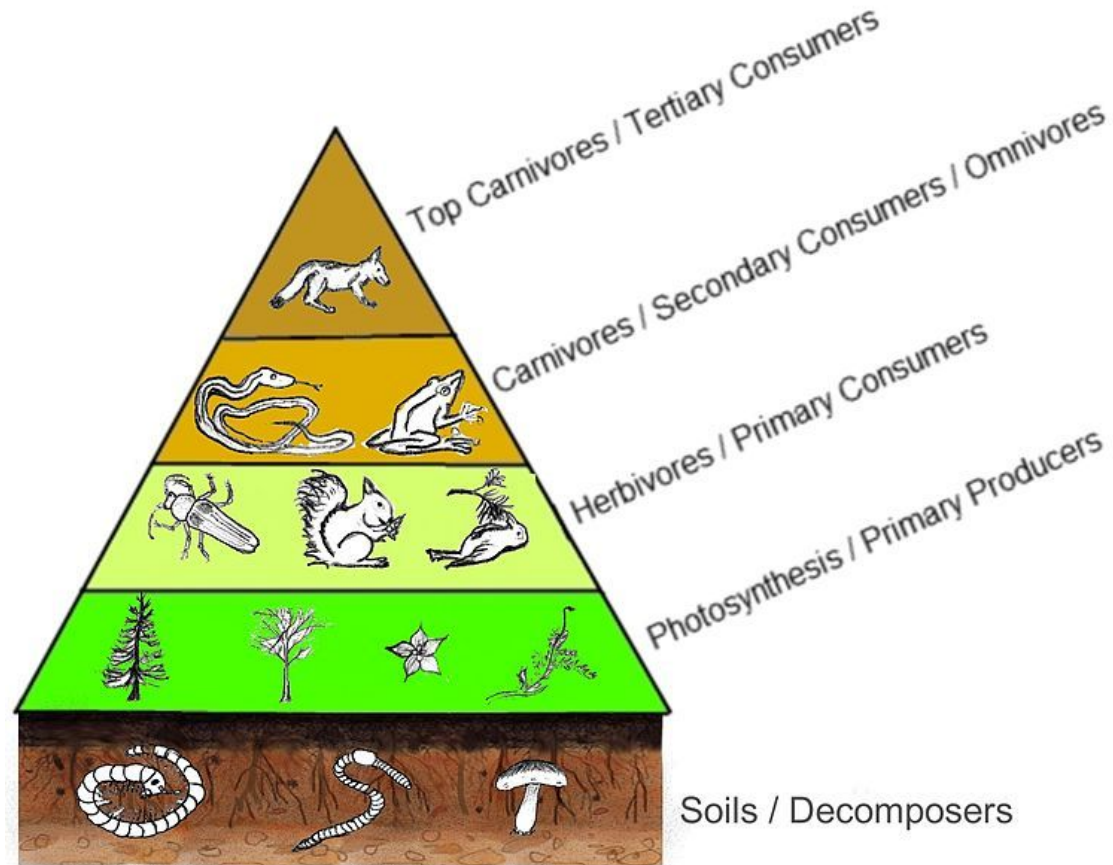
Why Plants Matter: The Trophic Pyramid

Plants, called *Primary Producers*, are the foundation of life on Earth.

“Without plants, there is no life.”

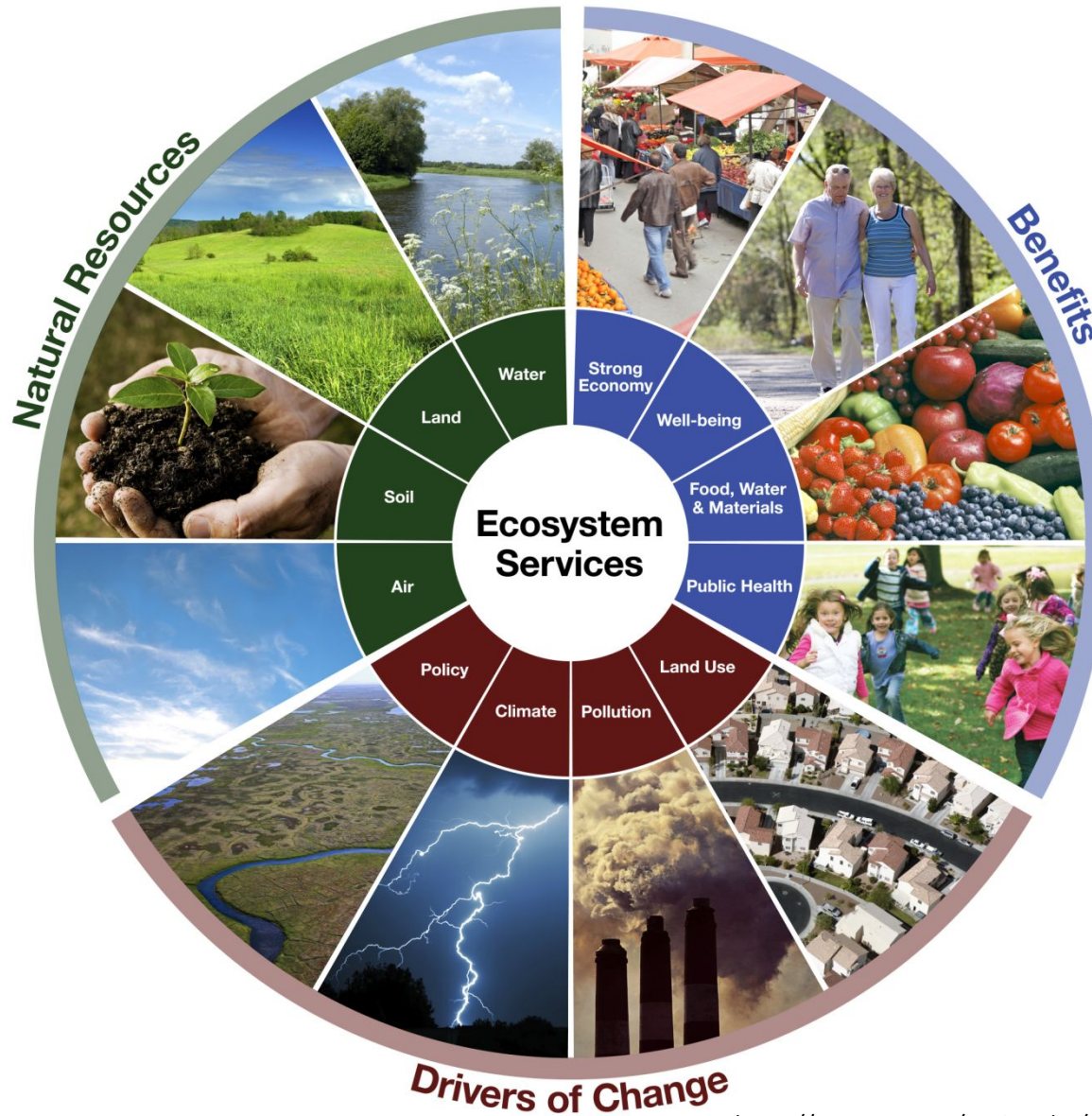
UN Global Strategy for Plant Conservation 2011-2020

Native plant species have tremendous impact on whole food webs, biodiversity, and carbon sequestration.





Ecosystem Services



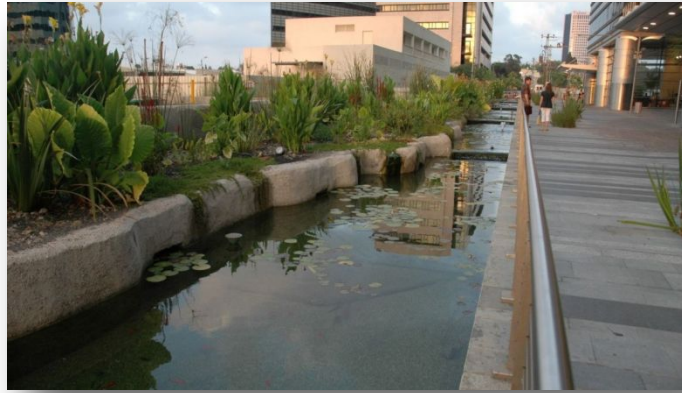
Native Plants and Ecosystem Services

Waste treatment

Flood prevention

Water purification

Carbon sequestration

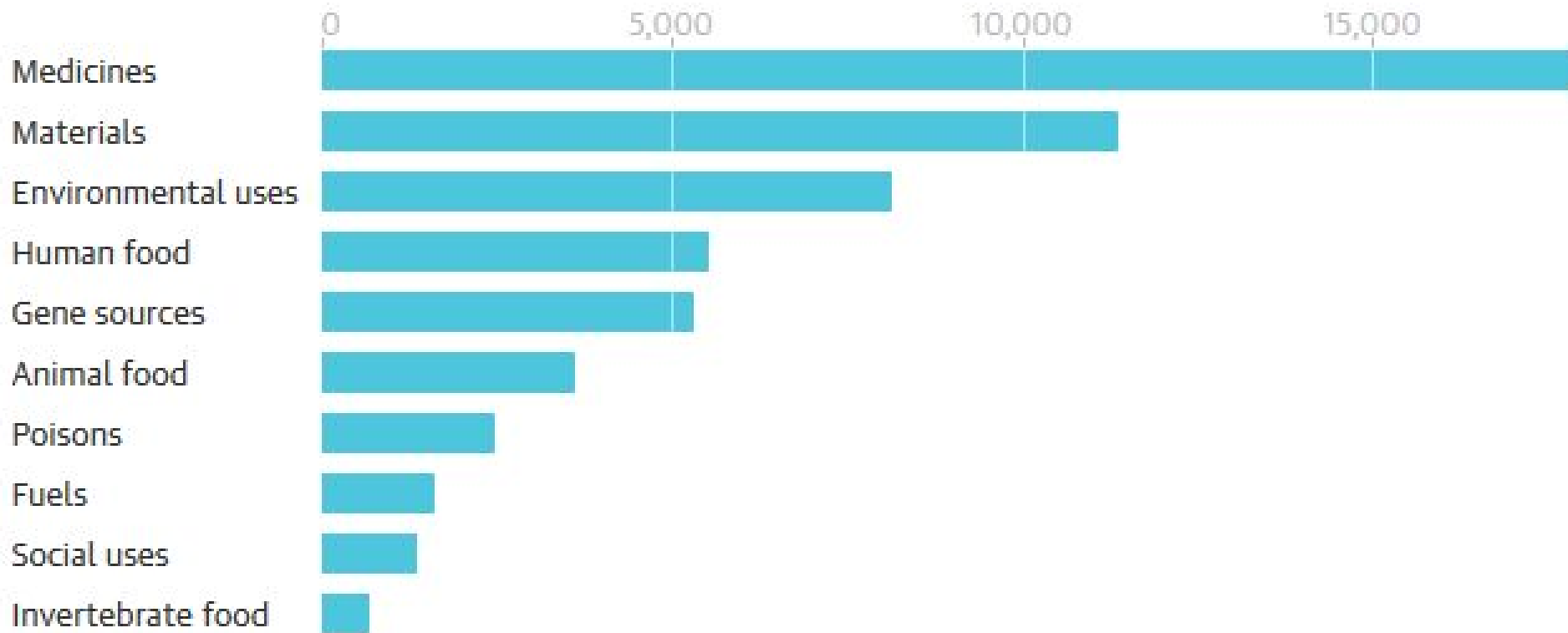


Nature's Infrastructure: Native Plants and Ecosystem Services



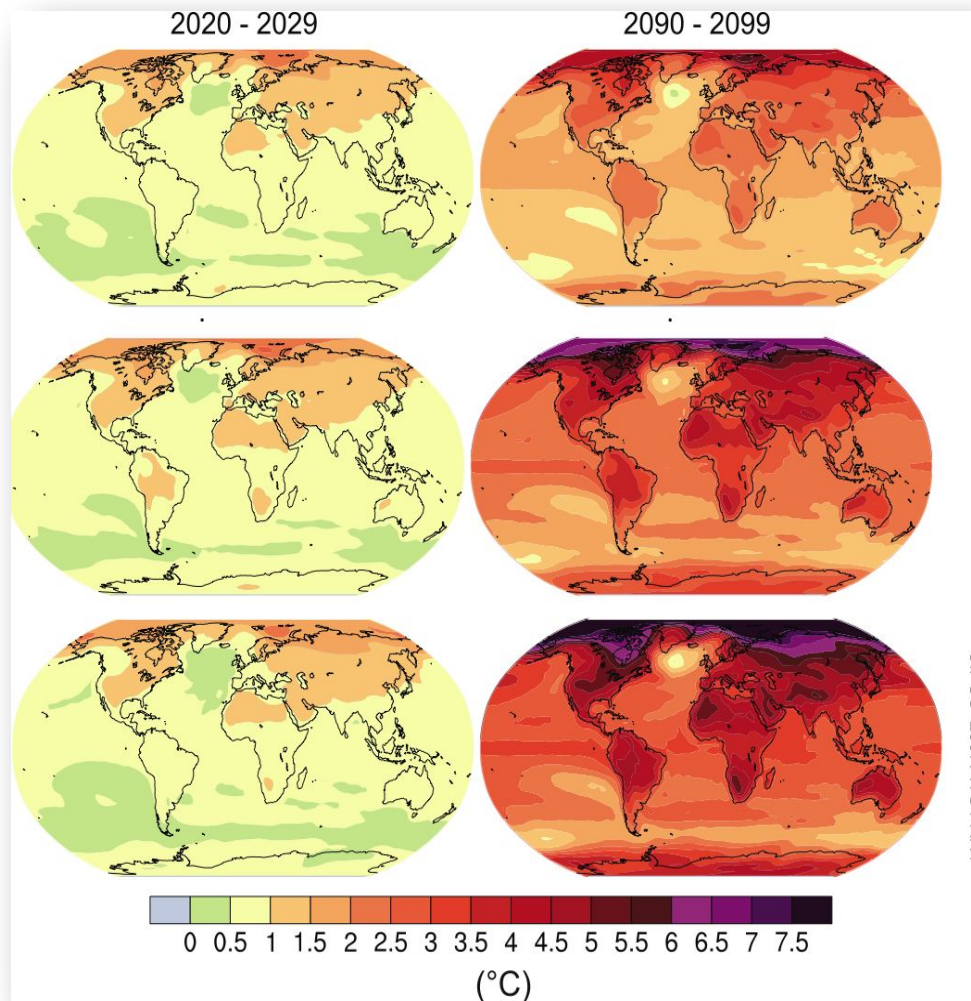
High Line, New York City

Uses for Native Plants



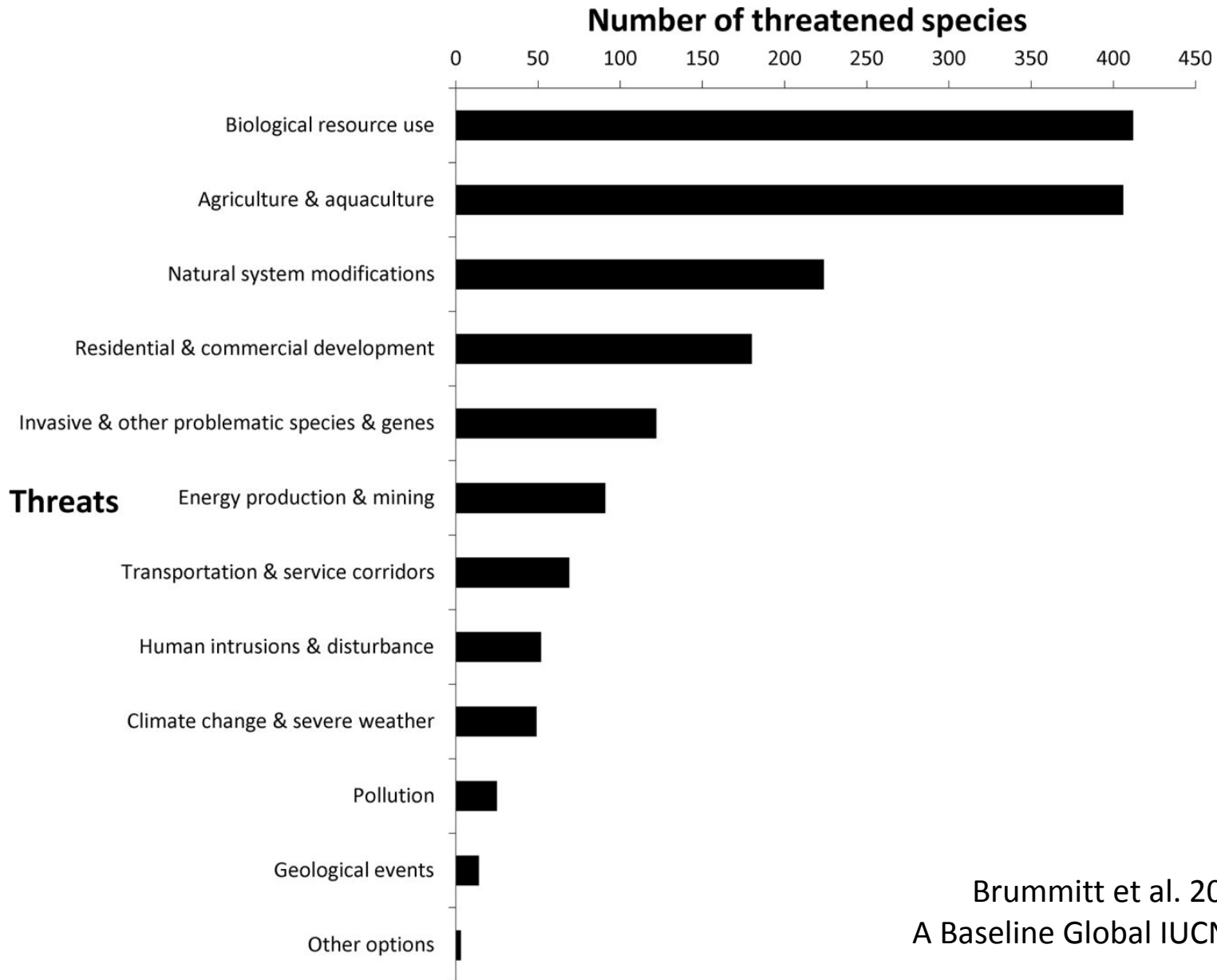
Guardian graphic | Source: Royal Botanic Gardens Kew: State of the World's Plants

Projected Temperature Changes



NOAA 2008

Green Plants in the Red: Global Threats



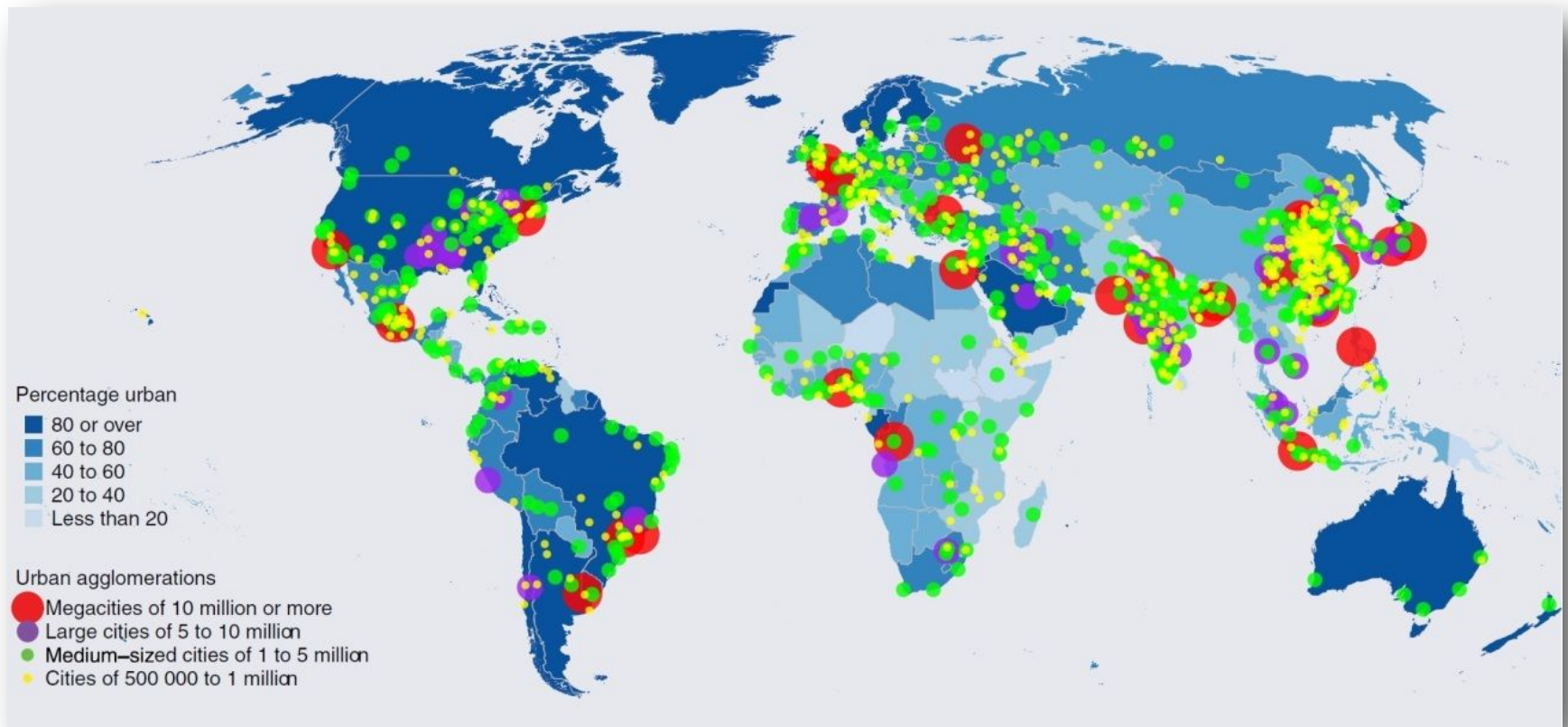
Brummitt et al. 2015 PLOS One
A Baseline Global IUCN Assessment

Green Plants in the Red: Global Threats

- Destruction of habitats for farming (31%)
- Deforestation (21%)
- Urbanization (13%)



Green Plants in the Red: Global Threats

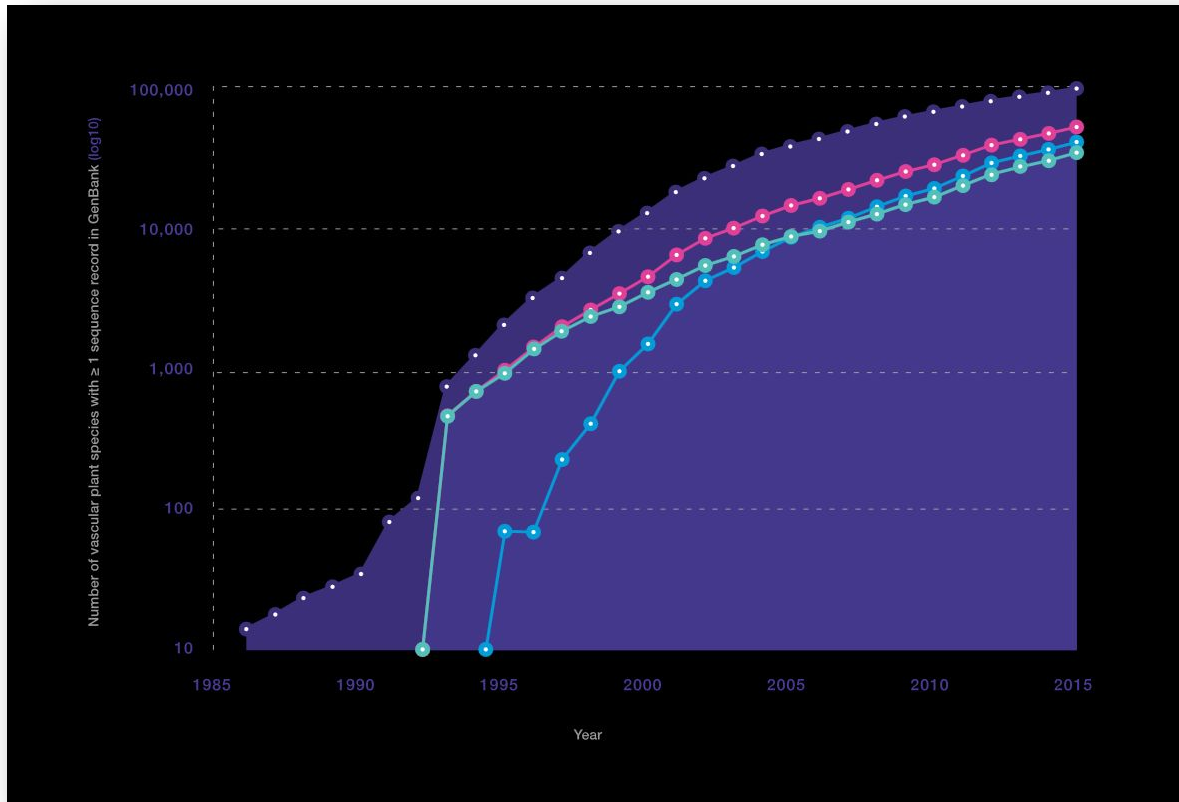


What Can We Do to Increase Plant Community Resiliency?



Investing in the Future: Genotypic Security

Genotype: the genetic makeup of an organism or group of organisms with reference to a single trait, set of traits, or an entire complex of traits.

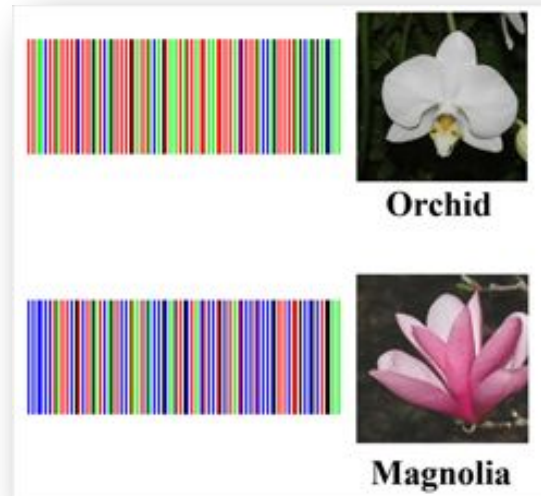


Figures refer to the number of species in GenBank with:

- 'Any sequence' (any sequence data at all)
- 'rbcL gene' (only sequences marked as copies of the rbcL gene)
- 'matK gene' (only sequences marked as copies of the matK gene)
- 'matK or rbcL' (only matK or rbcL gene copies)

Investing in the Future: Nagoya Protocol

The 2014 *Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity*: an international agreement which aims at sharing the benefits arising from the utilization of genetic resources in a fair and equitable way.

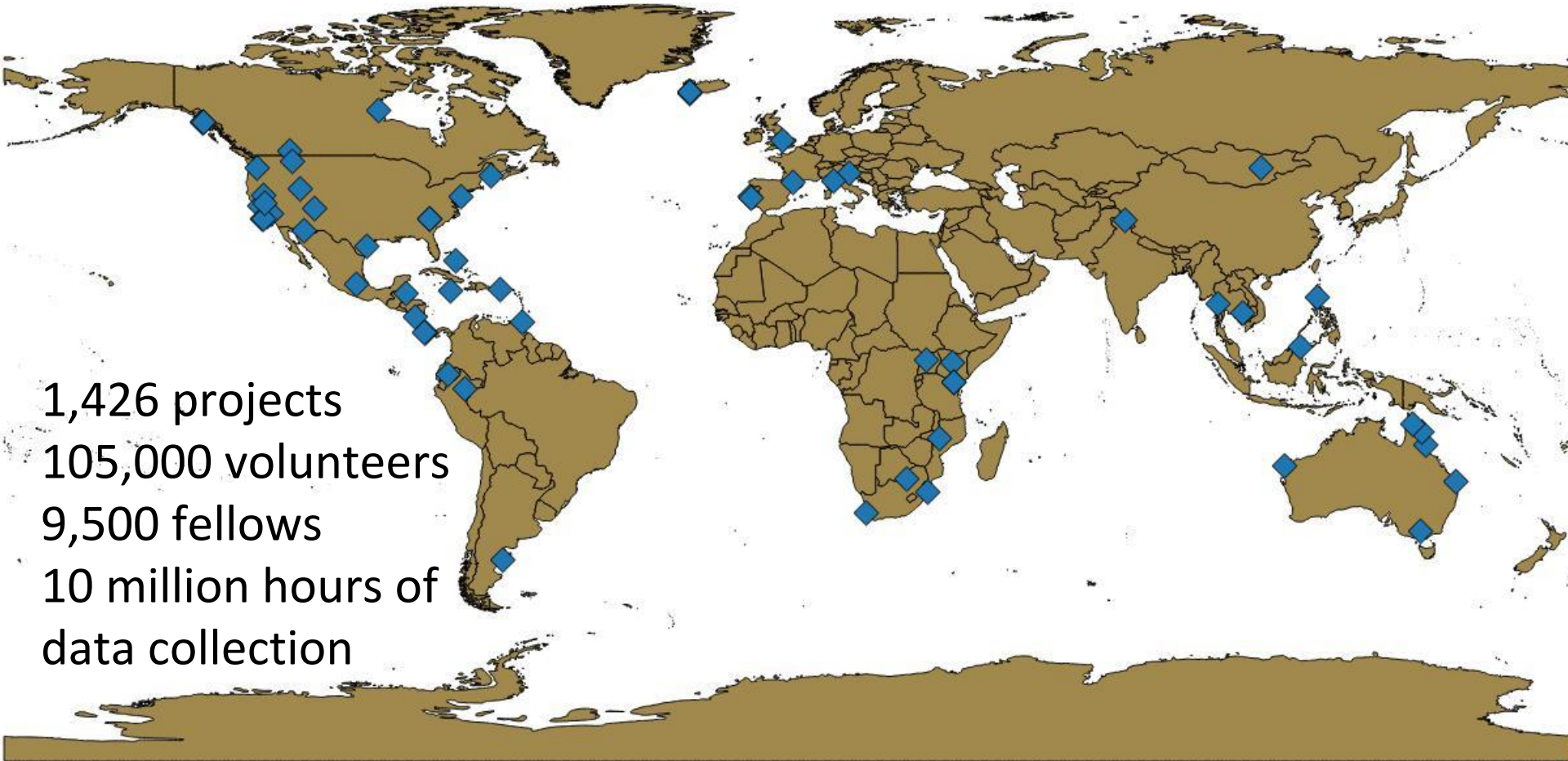


Investing in the Future: Funding Global Resiliency Science



Earthwatch engages **people** worldwide in scientific field research and education to promote the understanding and action necessary for a sustainable environment.

Earthwatch Citizen Science Since 1971

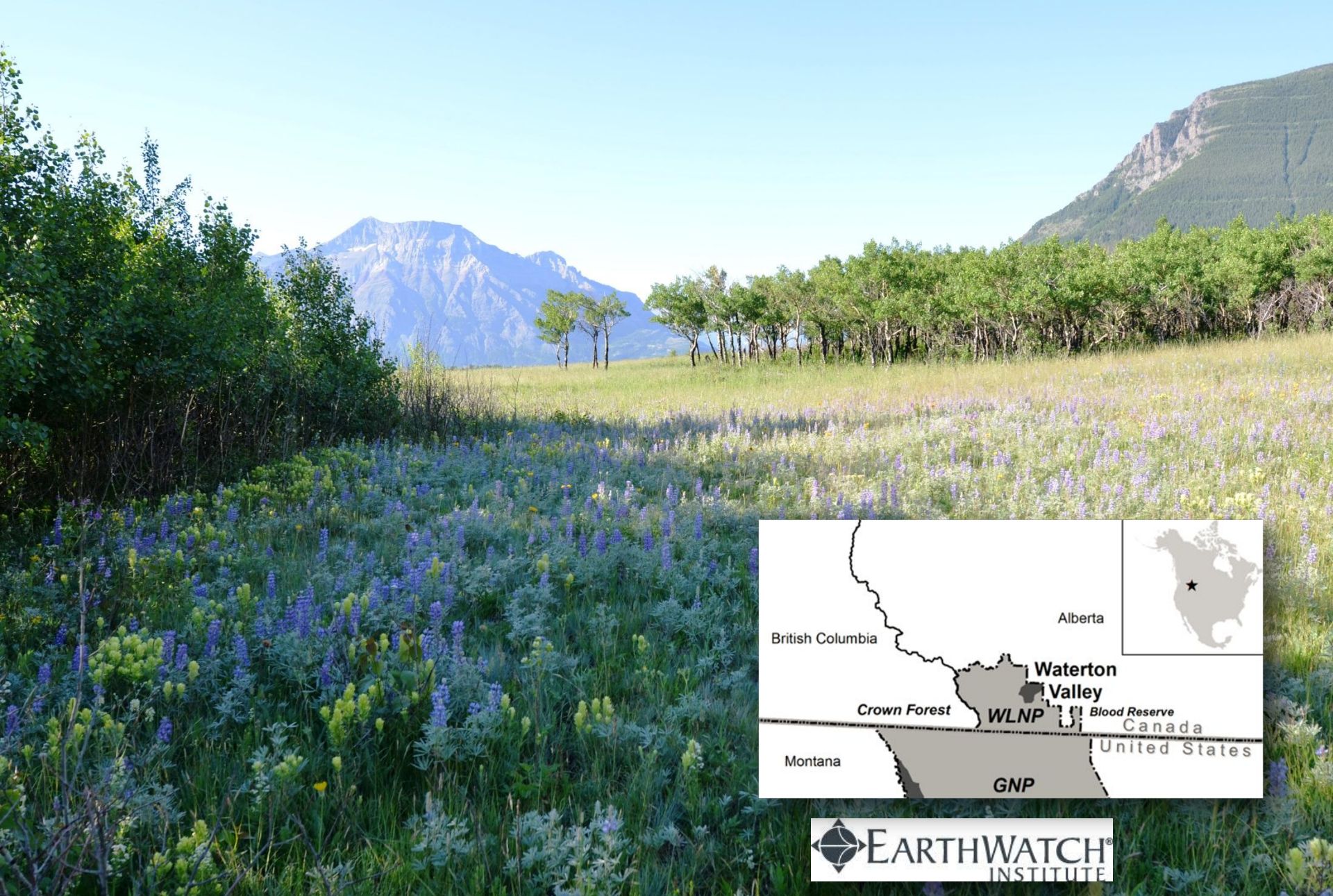


1,426 projects
105,000 volunteers
9,500 fellows
10 million hours of
data collection

ceisenberg@earthwatch.org

www.Earthwatch.org

Restoring Fire, Wolves, and Bison to the Canadian Rockies



Restoring Fire, Wolves, and Bison to the Canadian Rockies

Context: social ecology



It Takes a Village to Restore Native Plants and Processes



Fire
Predation
Bison



Waterton Prairie Indicator Grass Species



rough fescue
(*Festuca
campestris*)



Parry's oatgrass
(*Danthonia
parryii*)



bluebunch wheatgrass
(*Pseudoroegneria
spicata*)



Idaho fescue
(*Festuca
idahoensis*)

In Canada, only 3% of native prairie habitat remains.

Ol Pejeta, Kenya, Grazing Lawns



Jake Goheen, University of Wyoming
Lion Tri-Trophic Interactions



Ol Pejeta Native Plants: A Bottom-Up Approach

Red oat grass (*Themeda triandra*)

Bamboo grass (*Penisetum mesianum*)

Wiry love grass (*Eragrostis tenuifolia*)

Masai love grass (*Eragrostis superba*)

Brown wood grass (*Panicum maximum*)

Star Grass (*Cynodon dactylon*)



Native Plant Global Restoration Challenges

Availability of native seed and seedlings for restoration

Lack of partnerships:

- State
- Federal
- Private sector
- NGO



The US is a world leader in establishing these partnerships.



The preceding presentation was delivered at the

2017 National Native Seed Conference

Washington, D.C. February 13-16, 2017

This and additional presentations available at <http://nativeseed.info>

