Creating Global Resiliency: The Ecological Case for Native Seeds

Cristina Eisenberg, PhD
Earthwatch Chief Scientist
Smithsonian Research Associate
Oregon State University

2017 National Native Seed Conference
Washington, DC
February 15, 2017
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
Meeting the growing needs of humanity in a rapidly changing world.
April 22, 1970
The First Earth Day
Poster by Ralph Kelly
The Challenge: UN 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
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.
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

Royal Botanical Gardens Kew
State of the World’s Plants 2016
https://stateoftheworldsplants.com/
Projected Temperature Changes

NOAA 2008
Green Plants in the Red: Global Threats

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

Royal Botanical Gardens Kew
State of the World’s Plants 2016
https://stateoftheworldsplants.com/
Green Plants in the Red: Global Threats
What Can We Do to Increase Plant Community Resiliency?
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)

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.

https://www.cbd.int/abs/default.shtml
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

- Idaho fescue (*Festuca idahoensis*)
- bluebunch wheatgrass (*Pseudoroegeneria spicata*)
- Parry’s oatgrass (*Danthonia parryii*)
- rough fescue (*Festuca campestris*)

In Canada, only 3% of native prairie habitat remains.
Ol Pejeta, Kenya, Grazing Lawns

Jake Goheen, University of Wyoming
Lion Tri-Trophic Interactions
Red oat grass (*Themeda triandra*)
Bamboo grass (*Pennisetum mesianum*)
Wiry love grass (*Eragrostis tenufolia*)
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