The Promise (and some perils) of Ecological Restoration

Serenoa Chapter of the Florida Native Plant Society
Marie Selby Botanical Gardens
January 19, 2019

George D. Gann
International Policy Lead
www.regionalconservation.org
www.ser.org

Institute for Regional Conservation
Chief Conservation Strategist
A Few Introductory Thoughts
Rather than focusing on charismatic animals or plants with narrow global ranges, IRC seeks to protect, restore and manage all biodiversity on a regional basis, and to **prevent regional extinctions of rare plants, animals and ecosystems**. All conservation is ultimately local.
SER advances the science, practice and policy of ecological restoration to sustain biodiversity, improve resilience in a changing climate, and re-establish an ecologically healthy relationship between nature and culture. All conservation is also global.
“Particularly hazardous to Florida is the potential for a **global climate change** related to tropical deforestation and the excess burning of fossil fuels. A slight **rise in sea level** could destroy many of our native plant communities…”

“In the United States, and particularly in Florida, preservation has been the basis of the native plant movement. More recently, **restoration** as a conservation alternative has received some attention, although it is certainly not accepted by all.”

“By concentrating on **sustainable development**, rather than preservation, as a goal international conservation movements seem to be moving ahead in terms of meeting the environmental needs of the future.”
International species require international protection and management.
Asplenium serratum L.
Bird's-nest fern, wild birdnest fern

Paraná, Brazil

Fakahatchee Strand, Florida
Schoenus nigricans
Black bogrush
Plants are not native to states or countries, they are native to ecosystems, which are different from place to place.
56% of SOMC’s occur in hardwood hammocks.
Ecological Restoration and Repair Around the World
In 1984 Norman Myers estimated that there were 12,130 international non-profit groups (INGOS) worldwide, mostly dealing with environmental and social issues.

Paul Hawken 2007: estimated that there were more than 1,000,000 non-profit groups and community organizations dedicated to the “environmental and social justice movement”.
Ecological Restoration Alliance
of Botanic Gardens

Projects and sites

New York Botanical Garden, The
The Thain Family Forest Program
The Thain Family Forest is a 20 ha old growth, urban forest in the heart of the New York Botanical Garden and is the largest remnant of forest that once covered much of New York City. In 2008, the garden created a comprehensive program of research, education, and ecological restoration.
Read more

Morton Arboretum, The
Maintenance and restoration of natural areas and woodland habitats in Northern Illinois
The Morton Arboretum is the site of numerous restoration projects. This includes the restoration of a 410 hectare tallgrass prairie and savanna and 280 hectares of oak woodland.
Read more

Botanic Garden Meise
Rescuing critically endangered species in Belgium
Botanic Garden Meise is restoring semi-natural grassland habitats in Southern Belgium.
Read more

Chicago Botanic Garden
Restoring McDonald Woods
Chicago Botanic Garden is restoring a remnant oak woodland within the grounds of the garden.
Read more

Jardín Botánico Francisco Javier Clavijero
Cloud Forest Restoration Project in Xalapa, Veracruz, Mexico
This project is restoring degraded cloud forest habitats with native species in the north of Veracruz, Mexico.
Native plant garden & nursery of J. Carlos Trejo-Torres, Merida, Mexico
Santa Maria Ecological Corridor, Parana, Brazil
Headwaters of Itaipu Hydroelectric Dam (14 GW)

150,000 acres reforested

Asplenium serratum

2 m long corridor
GRASSLAND RESTORATION IN THE WHITE CARPATHIAN MOUNTAINS

Fig. 2. Grassland restored with a regional seed mixture in the bufferzone of Certoryje National Nature Reserve. (I. Jongepierová)

Fig. 3. Brush harvesting. (I. Jongepierová)
Rewilding is based on the reintroduction of grazing animals such as wisent (European bison), European elk (known in America as moose), tarpan (the original wild horse), aurochs (the original wild ox), European beaver and the omnivorous wild boar, together with red deer and roe deer, including modern analogs of now extinct species.
Ecosystem Services Partnership’s first Middle East & North Africa (MENA) regional meeting in Dead Sea, Jordan

Focus on crop wild relatives, community engagement and women, delivery of ecosystems services.
Using termites to restore soils leading to larger restoration gains
Hawaii is experiencing an extinction crisis where 220 plant species have fewer than 50 wild individuals remaining.

Today, PEPP protects 190, or about half, of all Threatened and Endangered plant species in the state. By focusing on efficacy, cost efficiency, and innovation, we have been successful!

We have not lost a single species to extinction since our inception 15 years ago!

We are a small team of 11 and we accomplish much with very little. For just $5,000, we protect EACH of Hawaii’s 220 rarest plant species each year!

Due to the current challenging fiscal climate, PEPP anticipates a 70% funding reduction in 2019. If we are unable to fill our funding gap, species will go extinct. We have much to lose and no time to waste.

Focusing on protecting and restoring species with fewer than 50 remaining individuals
Previous reunification efforts in Korean Peninsula and WTO restrictions led to wetland mitigation and restoration efforts in South Korea.
The China Factor

What Does China’s 'Ecological Civilization' Mean for Humanity’s Future?

Opportunities for biodiversity gains under the world’s largest reforestation programme

Fangyuan Hua¹, Xiaoyang Wang², Xinlei Zheng³, Brendan Fisher⁵, Lin Wang⁶, Jianguo Zhu², Ya Tang⁴, Douglas W. Yu²,⁶ & David S. Wilcove¹,⁷
Global “Restoration” Policy and Initiatives
American nationalism and isolationism is not new since 1992.
Aichi Biodiversity Targets

- Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.
- Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use.
- Strategic Goal C: To increase the status of biodiversity by safeguarding ecosystems, species and genetic diversity.
- Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services.
- Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building.

Find National Targets
- Click here to view national targets, including national targets linked to the Aichi Biodiversity Targets by Parties.

Quick Guides for the Aichi

Evergreen

New land degradation neutrality goal to accelerate global restoration efforts

By Dennis Garity in Blog on November 30, 2015

The global community has set forth a new goal to tackle the scourge of land degradation and desertification. It could be a real breakthrough.

The United Nations Convention to Combat Desertification (UNCCD) had a "breakthrough moment" after two weeks of discussions and negotiations in Ankara, Turkey in October. The 195 parties to the Convention agreed to a global deal that sets a new environmental target: Achieving "land degradation neutrality" by 2030, and that restoring the world’s stock of healthy, productive land at a stable level.

Currently, 12 million hectares of land is being degraded annually via deforestation and forest degradation, the degradation and loss of agricultural land, and expansion of urban areas. But the new deal in Ankara commits the UN’s members, on a voluntary basis, to restore or rehabilitate at least 10% of that land area every year, which at least will keep things from getting worse. If that goal can be achieved by 2030, then the global community can look toward an even more ambitious target to gradually enable a major net increase in healthy land in future decades.
Ecological Restoration – a means of conserving biodiversity and sustaining livelihoods

A call to action by the ecological restoration joint working group of SER International and the IUCN Commission on Ecosystem Management

George D. Gann & David Lamb, editors

Introduction

Many of the world’s ecosystems have undergone significant degradation with negative impacts on biological diversity and peoples’ livelihoods. There is now a growing realisation that we will not be able to conserve the earth’s biological diversity through the protection of critical areas alone. This paper explains what is meant by the term "ecological restoration" and outlines how it can provide enhanced biodiversity outcomes as well as improve human well-being in degraded landscapes. In this way ecological restoration becomes a fundamental element of ecosystem management, although until recently, its potential has not always been fully
New Convention on Biological Diversity Aichi Targets Adopted October, 2010
DECISION ADOPTED BY THE CONFERENCE OF THE PARTIES TO THE CONVENTION ON BIOLOGICAL DIVERSITY

XIII/5. Ecosystem restoration: short-term action plan

The Conference of the Parties,

Recalling Article 8(f) and decisions XI/16 and XII/19,

Aware that Parties have identified ecosystem restoration needs in their national biodiversity strategies and action plans and in other national, regional and global strategies and/or plans, and that a number of ecosystem restoration activities are under way with support from various organizations and Governments, and noting that many degraded ecosystems are still in need of restoration,
A companion to the Short Term Action Plan on Ecosystem Restoration

Resources, case studies, and biodiversity considerations in the context of restoration science and practice

Recognizing the extraordinary opportunity that ecosystem restoration creates for addressing ecological, economic, and social issues, the Conference of the Parties to the United Nations Convention on Biological Diversity adopted at their 15th Conference of the Parties in 2015 in Cancun, Mexico, a Short Term Action Plan on Ecosystem Restoration (STAPER). The STAPER is implemented on a voluntary basis and provides step-by-step guidance to support governments in the development and implementation of their national restoration strategies.

The STAPER is based on four main groups of activities and 24 steps. The activities listed in the Plan operate as “a menu of options, and can be implemented by countries and governmental bodies, in collaboration with international, national and local organizations, and in accordance with national legislation, circumstances and priorities.” This website presents, for each group of activities and each specific activity of the STAPER:

- A synthesis and discussion of supporting knowledge and policy from restoration science and practice
- A selection of resources and tools that can be useful in the implementation of these activities
- A link to relevant project profiles on SER’s Restoration Resource Center, illustrating the application of the steps in context

Assessment of Opportunities for Ecosystem Restoration

To ensure that restoration activities are implemented in areas requiring restoration and that are high-priority taking into account ecological, economic, social and institutional realities, it is useful to implement broad-scale ecosystem assessments, including mapping, or to make use of existing assessments. These assessments can be undertaken at various levels according to national circumstances and adjusted in the light of more detailed assessments that result from the site-level activities in step C.

Access the detailed activities and featured resources under Group A

Improving the Institutional Enabling Environment for Ecosystem Restoration

In order to facilitate the implementation of ecosystem restoration actions, the
REDD = reduce emissions from deforestation and forest degradation. At the Climate Change Conference in Cancun, Mexico in November/December 2010, UNFCCC COP 16 formally included REDD+ into the international climate regime.
REDD includes activities that reduce emissions from deforestation and forest degradation. REDD+ contributes to conservation and the sustainable management of forests and enhancement of forest carbon stocks. Both have the potential to deliver significant social and environmental benefits, but many have also highlighted serious risks for Indigenous Peoples, local communities, and biodiversity.

In reality, the restoration component has lagged behind, in part because the demand in the carbon markets is not strong enough.
The Challenge

A global effort

The Bonn Challenge is a global effort to bring 150 million hectares of the world’s deforested and degraded land into restoration by 2020, and 350 million hectares by 2030.

It was launched in 2011 by the Government of Germany and IUCN, and later endorsed and extended by the New York Declaration on Forests at the 2014 UN Climate Summit.

Underlying the Bonn Challenge is the forest landscape restoration (FLR) approach, which aims to restore ecological integrity at the same time as improving human well-being through multifunctional landscapes.

The restoration of 150 million hectares of degraded and deforested lands in biomes around the world—in line with the FLR approach—will create approximately USD 84 billion per year in net benefits that could bring direct additional income opportunities for rural communities. About 90 per cent of this value is potentially tradable, meaning that it encompasses market-related benefits. Achieving the 350 million hectare goal will generate about USD170 billion per year in net benefits from watershed protection, improved crop yields and forest products, and could sequester up to 1.7 gigatonnes of carbon dioxide equivalent annually.
2 x Alaska
By 2030 – is that possible?
A guide to the Restoration Opportunities Assessment Methodology (ROAM)

The Global Partnership on Forest and Landscape Restoration

Initiative 20x20

Bringing 20 million hectares of degraded land in Latin America and the Caribbean into restoration by 2020.

APR900 (the African Forest Landscape Restoration Initiative) is a country-led effort to bring 90 million hectares of land in Africa into restoration by 2030. APR900 contributes to the Bonn Challenge, the African Resilient Landscapes Initiative (ARLI), the African Union Agenda 2063, the Sustainable Development Goals and other targets.
Land Restoration

- Examples of land restoration are found in every ecosystem.

- In croplands, these include reducing soil loss and improving soil health.

- In rangelands, maintenance of appropriate fire regimes, and the reinstatement of local livestock management practices.

- In wetlands, they include control over pollution sources, and reflooding wetlands damaged by draining.

- In urban areas, replanting with native species, and the development of ‘green infrastructure’ including parks and riverways.
Renewed vigor and commitment is needed to achieve transformational ecosystem restoration... This will allow [society] to address the interdependencies of ecosystems, human needs and biodiversity holistically through a landscape approach of ecosystem restoration, triggering accelerated progress at the pace and scale that is needed to maintain and restore ecosystems, bringing greater balance between social well-being, life on Earth, and sustainable economic growth.
“There has never been a better time to invest in land restoration.”

“Restoring degraded land has the potential to become big business.”

“Some entrepreneurs are betting that a huge new business opportunity for natural carbon capture and sequestration will emerge as more governments charge a fee for emissions that drive climate change.”

Something Good or Business as Usual in Different Packaging?
Paul Hawken’s new book *Drawdown—The Most Comprehensive Plan Ever Proposed to Reverse Global Warming* is available now.

[drawdown.org](https://drawdown.org)
Great ideas! But afforestation can be a problem.
And more are coming out of the woodwork...
Some suggest there are not enough resources to do what we are trying to do now – like prevent extinction – so we should concentrate on “priority” species and ecosystems.
Emergence of Novel Ecosystems concept, but lack of agreement about what it means exactly, especially in a practical sense.
So what is Ecological Restoration, Really?
Ecological Restoration

is the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed (SER 2004)

(< ecosystem restoration)
Is all restoration ecological restoration?

What is the minimum standard for a project to be called an ecological restoration project?
INTERNATIONAL STANDARDS FOR THE PRACTICE OF ECOLOGICAL RESTORATION - INCLUDING PRINCIPLES AND KEY CONCEPTS

FIRST EDITION: December 2016
Tein McDonald, George D. Gann, Justin Jonson, Kingsley W. Dixon

Society for Ecological Restoration

UN BIODIVERSITY CONFERENCE
COP13-COPMOP8-COPMOP2
CANCUN, MEXICO 2016
MAINSTREAMING BIODIVERSITY FOR WELL-BEING

George Gann (IRC, SER)
Tein McDonald (Society for Ecological Restoration Australasia, Australia)
KEY CONCEPT 1.

Ecological restoration practice is based on an appropriate local native reference ecosystem, taking environmental change into account.
Recovery Wheel

Figure 2. Progress evaluation ‘recovery wheel’ depicting a hypothetical 1-year old reconstruction project on its way to a 4-star condition. This template allows a manager to illustrate the degree to which the ecosystem under treatment is recovering over time. A practitioner with a high level of familiarity with the goals, objectives and site specific indicators set for the project and the recovery levels achieved to date can shade the segments for each sub-attribute after formal or informal evaluation. (Blank templates for the diagram and its accompanying proforma are available in Appendix 2.) Note: Sub-attribute labels can be adjusted or more added to better represent a particular ecosystem.
KEY CONCEPT 5.
Successful restoration draws on all relevant knowledge

KEY CONCEPT 6.
Early genuine and active engagement with all stakeholders underpins long term restoration success.
Full recovery may take a long time

• Look beyond individual projects, technology.
• Look for opportunities and adopt a policy of continuous improvement.
All restorative activities matter, no matter how small. But some activities many not be restorative at all (e.g., some mitigation, afforestation of native savanna).
But not everyone is happy.

What a surprise!

STRATEGIC ISSUES ARTICLE

On principles and standards in ecological restoration

Eric Higgs1,2, Jim Harris3, Stephen Murphy4, Keith Bowers5, Richard Hobbs6, Willis Jenkins7, Jeremy Kidwell8, Nikita Lopoukhine9, Bethany Sollerdal10, Katherine Suding11, Allen Thompson12, Steven Whisencant13

The Society for Ecological Restoration (SER) has long debated how to define best practices. We argue that a principles-first approach offers more flexibility for restoration practitioners than a standards-based approach, is consistent with the developmental stage of restoration, and functions more effectively at a global level. However, the solution is not as simple as arguing that one approach to professional practice is sufficient. Principles and standards can and do operate effectively together, but only if they are coordinated in a transparent and systematic way. Effective professional guidance results when standards anchored by principles function in a way that is contextual and evolving. Without that clear relation to principles, the tendency to promote performance standards may lead to a narrowing of restoration practice and reduction in the potential to resolve very diverse and complex ecological and environmental challenges. We offer recommendations on how the evolving project of restoration policy by SER and other agencies and organizations can remain open and flexible.

Key words: codes of ethics, principles, professional practice, scope of restoration, standards

Implications for Practice

- A flexible, open approach to restoration practice is required to address a rapid scaling up of restoration investment, climate change, human needs, institutional uncertainties, and locally appropriate innovations in practice.
- A principles-first approach exemplified in the Society for Ecological Restoration’s “Code of ethics” and “Ecological restoration in protected areas” offers flexible and adaptable models for professional practice in a wider variety of settings.
- An approach to professional practice based on performance standards may limit innovation and the reach of ecological restoration.
- Principals and standards can operate effectively together, but only if carefully coordinated and, generally, principles truly a remarkable time for the often urgent tasks of helping to recover degraded, destroyed communities, ecosystems, and landscapes.

The Society for Ecological Restoration (SER) has introduced a succession of policies to guide practice. From discussions in the 1980s and 1990s about the definition of restoration through the SER International Primer on Ecological Restoration (SER 2004) and subsequent guidance including the Code of Ethics (SER 2012), the joint World Commission on Protected Areas (WCPA) and SER have developed a comprehensive framework for guiding restoration practices.

Author contributions: All contributors wrote and edited the article.

1 School of Environmental Studies, University of Victoria, Victoria, British Columbia, Canada. 2Adjunct Professor, School of Environmental Studies, University of Victoria, Victoria, British Columbia, Canada. 3School of Environmental Studies, University of Victoria, Victoria, British Columbia, Canada. 4University of Victoria, Victoria, British Columbia, Canada. 5School of Environmental Studies, University of Victoria, Victoria, British Columbia, Canada. 6School of Environmental Studies, University of Victoria, Victoria, British Columbia, Canada. 7School of Environmental Studies, University of Victoria, Victoria, British Columbia, Canada. 8School of Environmental Studies, University of Victoria, Victoria, British Columbia, Canada. 9School of Environmental Studies, University of Victoria, Victoria, British Columbia, Canada. 10School of Environmental Studies, University of Victoria, Victoria, British Columbia, Canada. 11School of Environmental Studies, University of Victoria, Victoria, British Columbia, Canada. 12School of Environmental Studies, University of Victoria, Victoria, British Columbia, Canada. 13School of Environmental Studies, University of Victoria, Victoria, British Columbia, Canada.
International Standards is a Living Document

First revision due out March 2019

We are:

1. improving the **restorative continuum** with respect to the ecosystem-landscape nexus;

2. clarifying that **restoration targets** must allow for temporal change – an inherent property of all ecosystems;

3. strengthening the discussion of **cultural-social elements** including traditional cultural ecosystems and semi-natural ecosystems; and,

4. Considering **provenance issues** – note that this pertains within species (‘assisted migration’ is largely not accepted).
Some Open Questions

• What is a native plant (or animal) in the age of change?
• What is a native ecosystem?
• What are or were the roles of people in native ecosystems?
Ecological Restoration has become widespread and adopted by organizations at all scales across the globe along with many other related activities.

The Promise
Ecological Restoration can

- Protect and recover biodiversity (ecosystems, species, genes)
- Increase the delivery of ecosystem services, including climate change mitigation and adaptation, clean water, food
- Help “re-establish an ecologically healthy relationship between nature and culture”
Some of the Perils

- Using restoration as an excuse for destruction
- Promising more than we can deliver
- Not planning for change (e.g., lack of adaptive management)
- Creating perverse subsidies leading to collateral damage
- Conflating Ecological Restoration with other things, some good, some bad
- Not recognizing that small contributions matter
- Getting obsessed with our own projects and losing site of the big picture
- Ignoring stakeholders and failing to build constituencies of support
- Not being creative enough, not accepting new ideas and techniques
And What About Florida?
Our Issues (to name a few)

- Habitat destruction
- Collecting and poaching
- Destruction of natural hydrology
- Urbanization and fragmentation
- Coastal erosion
- Invasive species
- Fire suppression
- Loss of pollinators and dispersers
- Sea level rise
- Extreme weather
- Climate change
- Ignorance
- Apathy
- Greed

Trichocentrum undulatum, 1916
Our Solutions (in part)

- We document the extinction of species and the destruction of ecosystems, the depletion of rare species and the degradation of habitats
- We acquire protected areas and write management plans
- We fence, collect, grow, plant, chop, burn, spray, weed, bulldoze, rip, tear, water, augment, reintroduce and garden
- We learn, study, collate, disseminate and experiment
- We develop tools and new technologies
- We educate, volunteer, advocate and protest
- We hope and plan for a better future
We Restore Degraded Ecosystems, Small and Large

Comprehensive Everglades Restoration Plan (CERP)

The CERP was authorized by Congress in 2000 as a plan to "restore, preserve, and protect the southern Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection." At a cost of more than $10.5 billion and with a 35+ year timeline, this is the largest hydrologic restoration project ever undertaken in the United States.
Some Things We Should Consider
Humility is important. What we know today may not be what we understand tomorrow.

Carica papaya
We understand so much, but we still have basic work to do.

Not listed by FNAI or FDACS.
Identify Opportunities
Use Available Tools (and make them better!)

How Does It Work?

- County Lists – Ecological generalist with broad ranges (95% rule)
- ZIP Code Lists – Ecological generalists + generalists within local habitats
- Habitat Lists – Generalists + habitat specialists within historical range within ZIP Code
Sand holly, Carolina holly

Ilex ambigu

Aquifoliaceae

Dimensions: A shrub or small tree to about 20 feet in height.

Map of select IRC data from peninsular Florida.

Light Requirements: Full sun to light shade.

Wildlife and Ecology: Provides significant food and cover for wildlife.

Comments: We are currently adding data for this species for central and northern Florida. If you would like to contribute information or images, please contact George Gann via the IRC staff page.
Be Creative and Have Fun
Plan for Change (e.g., Climate Change and Sea Level Rise)

Lancewood – *Nectandra coriacea*
West Indian Mahogany
Swietenia mahagoni

Be Thoughtful
Celebrate Success!

Delray Beach c. 1980,
Delray Beach 2016
Collaborate, Collaborate, Collaborate!
Play the Long Game
Thanks!
(and happy Martin Luther King Jr. Day)