

#### INTERNATIONAL STANDARDS FOR THE PRACTICE OF ECOLOGICAL RESTORATION

SER-WC 2018 RESTORATION FOR RESILIENCE

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### Outline

- The Challenge: Restoration is becoming mainstream, but implementation and effectiveness is inconsistent at best. Ecosystem services are a principle reason for restoration, but focus on single services can create perverse incentives.
- The Solution: SER's International Standards provide criteria for ensuring high quality restoration from project design to implementation. They can also help promote the bundling of ecosystem services.
- Next Steps: International stakeholder engagement, buy in, adoption, and implementation of ecological restoration standards. Integration between ecological restoration and ecosystem services.



# The Challenge

MAINSTREAMING RESTORATION WITHOUT DIMINISHING IT

## Definitions

- •Ecological or ecosystem restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. (SER Primer 2004)
- Restorative activities are those activities that may not necessarily be ecological restoration but which are based on the principles underpinning ecological restoration. (SER International Standards 2016)
- •Forest and landscape restoration (FLR) is the process of regaining ecological functionality and enhancing human well-being across deforested or degraded forest landscapes. (Global Partnership on Forest and Landscape Restoration)



## Restoration and Climate Targets Everywhere

- Bonn Challenge
  - Restore 150 million hectares of degraded land by 2020
  - Restore 350 million hectares of degraded land by 2030
- Aichi Biodiversity Target 15
  - All signers to the Convention on Biological Diversity to restore 15% of their degraded lands by 2020
- Paris Climate Summit
  - Limit global temperature rise to 1.5-2.0° C
  - At least US\$100 Billion/year for adaptation and mitigation.



## Case study: Grain for Green Program in China

- Started in 1999
- Re-established 27.8 million hectares of forest through 2013
- Considered largest or one of the largest reforestation programs in the world
- Focus is on specific ecosystem services of flood control and erosion control, as well as reforestation for timber, tree fruits and other cash crops
- Majority of projects (82%) are monocultures
- Projects result in significant loss of biodiversity for bees and birds
- Grain for Green can be improved with native multi-species reforestation efforts

Hua et al. 2016. Opportunities for biodiversity gains under the world's largest reforestation programme. *Nature Communications*. 7:12717



Figure 1 | Distribution of different types of GFGP forests across China.

## Aggressive Targets = Aggressive Action

#### TARGETS ≠ STANDARDS

- International targets for reforestation and restoration, but no international standards for restoration.
- Without standards, actions may have unintended consequences.
- International standards can create a basis upon which to measure project and program effectiveness.

#### CLIMATE MITIGATION ALONE ≠ ECOLOGICAL RESTORATION

- Carbon and reforestation targets drive <u>afforestation</u> native ecosystems and biodiversity can be degraded
- Minimal attention to socio-cultural/socio-economic needs and realities

#### BUT... INTEGRATING BIODIVERSITY AND SOCIAL SOLUTIONS INTO CLIMATE EFFORTS CAN HELP ACHIEVE ECOLOGICAL RESTORATION GOALS



# The Solution

INTERNATIONAL STANDARDS FOR ECOLOGICAL RESTORATION

### International Standards

- Built on Australia standards and foundation docs
- Adapted for consistency with earlier SER foundation documents
- Reviewed by 2 dozen external reviewers from around the world, incorporating broad perspectives on restoration.
- Introduced at Convention on Biological Diversity COP13 in Cancun, Mexico; December 2016
- Designed to be a living document with regular review and revision.



INTERNATIONAL STANDARDS FOR THE PRACTICE OF ECOLOGICAL RESTORATION - INCLUDING PRINCIPLES AND KEY CONCEPTS

FIRST EDITION: December 2016

Tein McDonald, George D. Gann, Justin Jonson, Kingslev W. Dixon



#### International Standards



The standards are applicable in all types of ecosystems

Photos courtesy Tein McDonald

#### International Standards



The standards are applicable across all sectors

Photos courtesy Tein McDonald

#### Section I: Introduction

- Ecological restoration as a means of conserving biodiversity and improving human wellbeing
  - Important to deliver both ecosystem services and biological diversity
- Need for Standards
- Definitions of key terms, including ecological restoration:

**Ecological restoration** is the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed.



### Section I: Introduction

#### THREE UNDERPINNING PRINCIPLES

To be successful, ecological restoration practice should be effective, efficient and engaging (Keenleyside et. al. 2012):

- (a) EFFECTIVE ecological restoration establishes and maintains an ecosystem's values.
- (b) EFFICIENT ecological restoration maximizes beneficial outcomes while minimizing costs in time, resources and effort.
- (c) ENGAGING ecological restoration collaborates with partners and stakeholders, promotes participation and enhances experience of ecosystems.



Developing capacity for a protected planet

#### Section I: Introduction

A REFERENCE ECOSYSTEM is a model characteristic of the particular ecosystem that informs the **target** of the restoration project. This involves describing the specific compositional, structural, and functional ecosystem attributes requiring reinstatement to a self-organising state leading to full recovery. This model is synthesized from information about past, present and anticipated future conditions at the site and similar sites in the region, in consultation with stakeholders.



Before/After



#### Section II: Six Key Concepts

- •Concept 1: Ecological restoration practice is based on an appropriate local native reference ecosystem, taking environmental change into account
- Concept 2: Identifying the target ecosystem's key attributes is required prior to developing longer term goals and shorter-term objectives
- •Concept 3: The most reliable way to achieve recovery is to assist natural recovery processes, supplementing them to the extent natural recovery potential is impaired
- Concept 4: Restoration seeks 'Highest and Best Effort' progression toward full recovery
- Concept 5: Successful restoration draws on all relevant knowledge
- Concept 6: Early genuine and active engagement with all stakeholders underpins longterm restoration success



#### Section II: Recovery Wheel



Hypothetical project on target for 4 star recovery

### Section II: Case Study Peniup, Western Australia





# Section II: Case Study New South Wales





### Section II: Case Study, Itaipu Dam, Brazil







 60,000 hectares of forest planted in a 100m strip along 1,500 km of reservoir.

- Purpose to achieve a variety of ecosystem services and mitigate dam construction
- On way to 5 star recovery via planting and natural regeneration

# Section III: Standard Practices for Planning & Implementation

- I. Planning and Design
- II. Implementation
- III. Monitoring, documentation, evaluation, and reporting
- IV. Post-implementation maintenance



Section IV: Restoration and the 'Big Picture'

Scaling Up Restoration

- Relationship of ecological restoration to other 'restorative activities'
  - Understanding how different project characteristics influence a project's outcome
  - Degrees of restorative activity currently or potentially applied in a range of sectors
  - Introducing the restorative continuum





#### The Restorative Continuum



### Glossary & Appendices

Section V: Glossary

- Appendix 1: Values and principles that underpin ecological restoration
  - Restoration should be
    - Effective
    - Efficient
    - Engaging

Appendix 2: Blank recovery wheel templates



## Available in Multiple Languages

- •Original version is in English, released in December 2016
- Portuguese and Spanish versions released in August 2017
- Arabic translation released by KISR in Kuwait in November 2017; to be released by SER in February 2018
- French and Korean to be released in February 2018
- Chinese in progress
- Still seeking volunteers/support for translation to other languages

ALL VERSIONS AVAILABLE FOR DOWNLOAD AT: SER.ORG/STANDARDS



ESTÁNDARES INTERNACIONALES PARA LA PRÁCTICA de la restauración ecológica- incluyendo principios y conceptos claves



Tein McDonald, George D. Gann, Justin Jonson, Kingsley W. Dixon



# Available via e-learning course

### SER E-Learning Course: Overview of the Practice of Ecological Restoration

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FROM VISION TO REALITY

International Review and Revisions (Standards 1.1)

- SER and IUCN Committee on Ecosystem Management cohosted a Forum on Biodiversity and Global Forest Landscape Restoration in Brazil in August 2017.
- More than 50 participants from more than 30 countries attended the forum, which included a specific track to discuss the standards.
- Outcomes included recommendations to:
  - expand the decision space for FLR to make biodiversity outcomes a greater focus in restoration planning and to include a wider array of ecosystem services in the evaluation of restoration needs



# International Review and Revision (Standards 1.1)

- October-December 2017:
  - Engaged with stakeholders and other parties in formal feedback process (beginning at SER2017 in Brazil)
    - Detailed online survey
    - Open-ended opportunity for written feedback
    - Solicit formal feedback from environment ministries and other international bodies most likely to use standards going forward.
- January-March 2018:
  - Review, consider feedback, outline scope of revision
- March-July 2018:
  - Revise standards, seek external review
- August-December 2018
  - Finalize v 1.1 of Standards
  - Promote v 1.1 to all stakeholders who engaged in process, including via participation in international meetings like CBD COP14 in November 2018



# External Adoption of Standards

- International bodies
  - Convention on Biological Diversity (CBD)
  - International Union for the Conservation of Nature (IUCN)
  - United Nations Framework Convention on Climate Change (UNFCC)
  - United Nations Convention to Combat Desertification (UNCCD)

#### International funding entities

- World Bank
- Global Environmental Facility
- Inter-American Development Bank
- Asian Development Bank
- African Development Bank
- International NGOs
- Multinational Corporations









## Implementation

- Release updated versions of standards document as needed in conjunction with international adoption
- Seek active implementation from all entities who adopt the standards – follow up with monitoring to promote effective use of the standards
- Engage partners and stakeholders to utilize the international standards as a framework for developing biome or region specific standards, e.g.
  - Tropical forests
  - Dry forests
  - Wetlands
  - Arid lands
  - Grasslands
- Project certification







Figure 5 Global RW assessment for the case study site

Fioratti, Marco 2017. Powering the Recovery Wheel: The development of a framework of quantitative tools to assess the ecological response of a river to restoration. MSc Thesis. Cranfield University.

#### Implementation

	ECOSYSTEM FUNCTION			
	Attribute	Survey	Base index	
	Productivity and cycling	Macrophytes	Vegetation cover within river banks	
	Habitat and interactions	Macro- invertebrates	Count of feeding functional groups (guilds)	
	Resilience/ recruitment	Macro- invertebrates	Number of taxa recorded for each functional group	
ABSENCE OF THREATS				
	Attribute	Survey	Base index	
	Contam.	Diatoms	Target-adjusted Diatom Trophic Index (TDI)	
	Invasive- species	Macro- invertebrates, diatoms, macrophytes	Invasivity-adjusted ratio of taxa designated as invasive	
	Over- utilization	Macro- invertebrates,	Ratio of taxa without resistance form	
EXTERNAL EXCHANGES				
	Attribute	Survey	Base index	
	Landscape flows	Landscape	dPc, distance-and probability-adjusted connectivity index of priority habitats	
	Gene flows	Macro- invertebrates	Ratio of aerial active and aquatic active taxa	
	Habitat links	Walkover	Circuit theory model simulation of river substrate and flow distribution	



STRUCTURAL DIVERSITY				
Attribute	Survey	Base index		
Vegetation strata	Landscape, macrophytes	Ratio of aquatic and terrestrial habitat layers to target level		
Trophic levels	Macro- invertebrates, vertebrates	Count of levels in the trophic web		
Spatial mosaic	Landscape	Ratio of seral to climax successional stages		
SPECIES ASSEMBLAGE				
Attribute	Survey	Base index		
Desirable plants	Macrophytes	Ratio of recorded taxa to assemblage mentioned in designation		
Desirable animals	Macro- invertebrates	Number of recorded Ephemeroptera, Plecoptera and Trichoptera taxa		
Undesirable species	Macro- invertebrates	Ratio of eutrophilic and polysabrobic taxa		
PHYSICAL CONDITIONS				
Attribute	Survey	Base index		
Substrate chemical	Macrophytes	Target-adjusted RMNI (River Macrophyte Nutrient Index).		
Substrate physical	Macro- invertebrates	PSI (Proportion of sediment- sensitive invertebrates)		
Water chemo- physical	Macro- invertebrates	WHPT (Whalley, Hawkes, Paisley & Trigg) taxon		

Fioratti, Marco. 2017. Powering the Recovery Wheel: The development of a framework of quantitative tools to assess the ecological response of a river to restoration. MSc Thesis. Cranfield University.

# THANK YOU

QUESTIONS:

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