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We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.
– Aldo Leopold, in "A Sand County Almanac" (1949)

Main reference

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Guidelines for Developing and Managing Ecological Restoration Projects
Society for Ecological Restoration International
Andre Clewell, John Rieger, and John Munro
(2nd Edition, December 2005)
copyright 2005

For more information,
http://www.ser.org/content/guidelines_ecological_restoration.asp

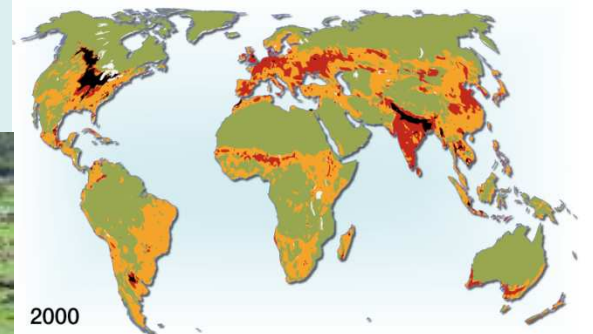Society for Ecological Restoration International
ONLINE

SER

Guidelines for Developing and Managing Ecological Restoration Projects

➢ **Assess the needs/feasibility** - **Conceptual Planning**

➢ **Build capacity & Preliminary Tasks**

➢ **Planning**

➢ **Implementation**

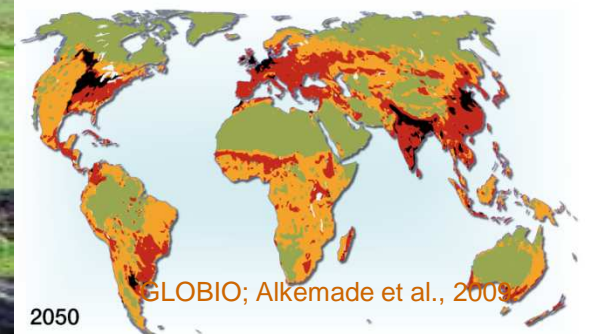➢ **Evaluation and Raising awareness**

Introduction

1700

2000

2050

Biodiversity, as ratio of species
abundance before human impacts

■ High impacts	0 - 25
■ High-medium impacts	25 - 50
■ Medium-low impacts	50 - 75
■ Low impacts	75 - 100 %

Mean species abundance (%)

GLOBIO; Alkemade et al., 2009

Phases of restoration projects

- ➤ **Assess the needs**
- ➤ **Build capacity**
- ➤ **Planning**
- ➤ **Implementation**
- ➤ **Evaluation and Publicity**

Assess the needs/feasibility
Conceptual Planning

▸ Identify the project site location, its boundaries and landowners

▸ Assess the need for ecological restoration, the kind of ecosystems to be restored

▸ Identify restoration goals:

- Recovery of a degraded or damaged ecosystem to former state
- Replacement of destroyed one with same kind
- Transformation
- Substitution

Examples of Goals and Objectives

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GOAL

Restore a Pontine oak ecosystem to a condition of ecological integrity (as described by historic accounts, existing *reference ecosystems*, and professional opinion).

OBJECTIVES

- Remove specified exotic species to below a certain percentage of ground cover (specify time-frame)>
- Plant native plants (specify type and number, time-frame)
- Re-introduce native butterflies
- Use externalities (sheep, fire, …)
  to control IAS growth

hetq.am

Assess the needs/feasibility
Conceptual Planning

▸ Identify physical site conditions in need of repair, list the kinds of biotic interventions needed

▸ Document project site conditions, biota and site history leading to the need for restoration

History leading to a new ecosystem

▶ History : reed beds have disappeared
after a new dam was built
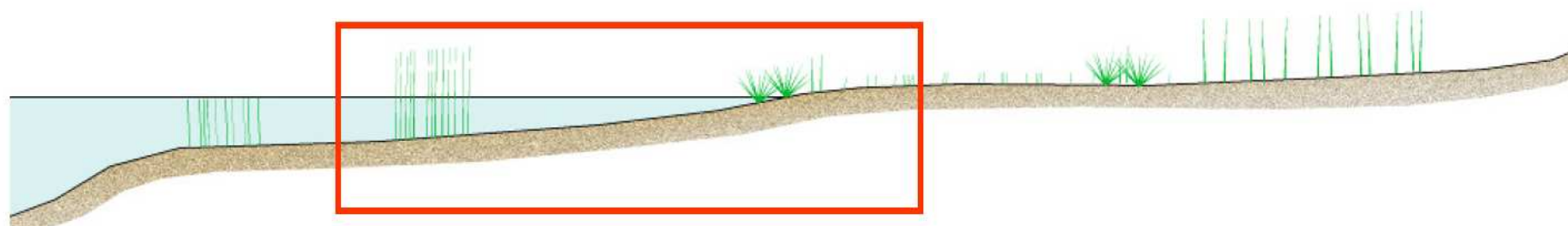
Biotic inventory

Herbier à potamot

Scirpe rescapés

Scirpaie en Saône

Scirpe maritime

Herbiers	Roselière riveraine	Parvoroselière	Annuelles	Mégaphorbiaie
(Potamogeton nodosus et Sparganium emersum)	(Scirpaie), (Glycéraie)	(cariçaie) (Oenantion aquaticae)	(Chenopodion rubri)	(Calystegion sepium)
Potamogeton perfoliatus	Schoenoplectus lacustris Sparganium errectum	Butomus umbellatus Bolboschoenus maritimus subsp cymosus		

Transect théorique

Raphaël ZUMBIEHL, Zoom

Phases of restoration projects

> ➢ **Assess the needs**
> ➢ **Build capacity**
> ➢ **Planning**
> ➢ **Implementation**
> ➢ **Evaluation and Publicity**

Build Capacity & Preliminary Tasks

▸ Identify the needs for manpower, equipment, biotic resources, and project-funding sources

▸ Address legal constraints (permits, contract constraints if conservation banking)

▸ Based on project duration, plan long-term protection and management

It can involve heavy techniques…

And many processes, to prepare, clean, plant, control IAS…

Thierry DUTOIT, CNRS

Build Capacity & Preliminary Tasks

▸ Appoint the restoration team, nominate a practitioner (technician)

▸ Prepare a budget for preliminary tasks

▸ Establish the reference ecosystem (see next slide)
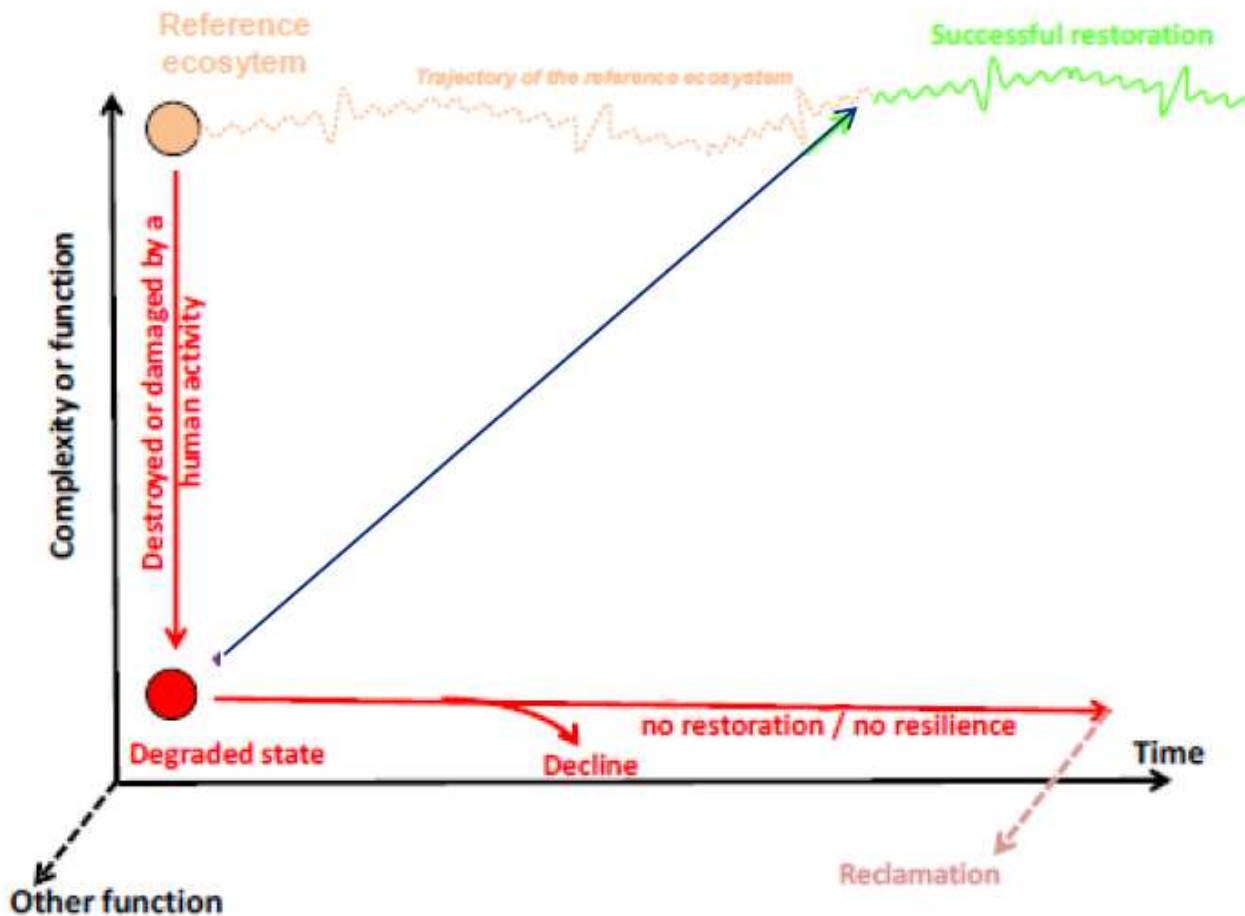
Establish the reference ecosystem

Figure 3: Modified from Hobbs & Norton 1996 and Clewell & Aronson 2007 (Buisson, Barnaud, Aronson & Dutoit unpublished). Schematic representation of the trajectory of a natural or semi-natural ecosystem over time. Several functions may appear (multi-dimensional – here 3D) (light pink curve: reference ecosystem trajectory), its advanced deterioration (red) and different possible states. Hatched arrows create the 3D.

Build Capacity &
Preliminary Tasks

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▶ Establish liaison with the public, publicize the project

▶ Involve stakeholders at large

▶ Train personnel

Phases of restoration projects

- ➢ **Assess the needs**
- ➢ **Build capacity**
- ➢ **Planning**
- ➢ **Implementation**
- ➢ **Evaluation and Publicity**

Planning

▸ Gather information for key species, assess effectiveness of restoration methods

▸ Review ecosystem goals (realistic?) and prepare a list of objectives to achieve them

Planning

▸ Describe actions to implement to achieve each objective

▸ Prepare performance standards and monitoring protocols

▸ Schedule the tasks from action list

▸ Provide equipment, supplies, biotic resources

▸ Prepare a budget for the implementation

Passive restoration

Thierry DUTOIT, CNRS

Phases of restoration projects

- ➢ **Assess the needs**
- ➢ **Build capacity**
- ➢ **Planning**
- ➢ **Implementation**
- ➢ **Evaluation and Publicity**

Implementation

▸ Mark boundaries and work areas

▸ Install permanent monitoring features

▸ Implement restoration tasks

The removal of Smelt Hill Dam in Falmouth, Maine, and other aquatic ecosystem restoration projects are conducted to restore aquatic ecosystems for fish and wildlife.

© US Army Corps of Engineers

Implementation

▸ Protect the project site

▸ Revisit the project site often to take adaptive measures

A fence encloses and protects rare species from over-grazing
© Parks Canada / D. Gummer

Phases of restoration projects

- ➤ **Assess the needs**
- ➤ **Build capacity**
- ➤ **Planning**
- ➤ **Implementation**
- ➤ **Evaluation and Publicity**

Evaluate and publicize

▸ Assess monitoring data

▸ Conduct an ecological evaluation

Publicize the work achieved

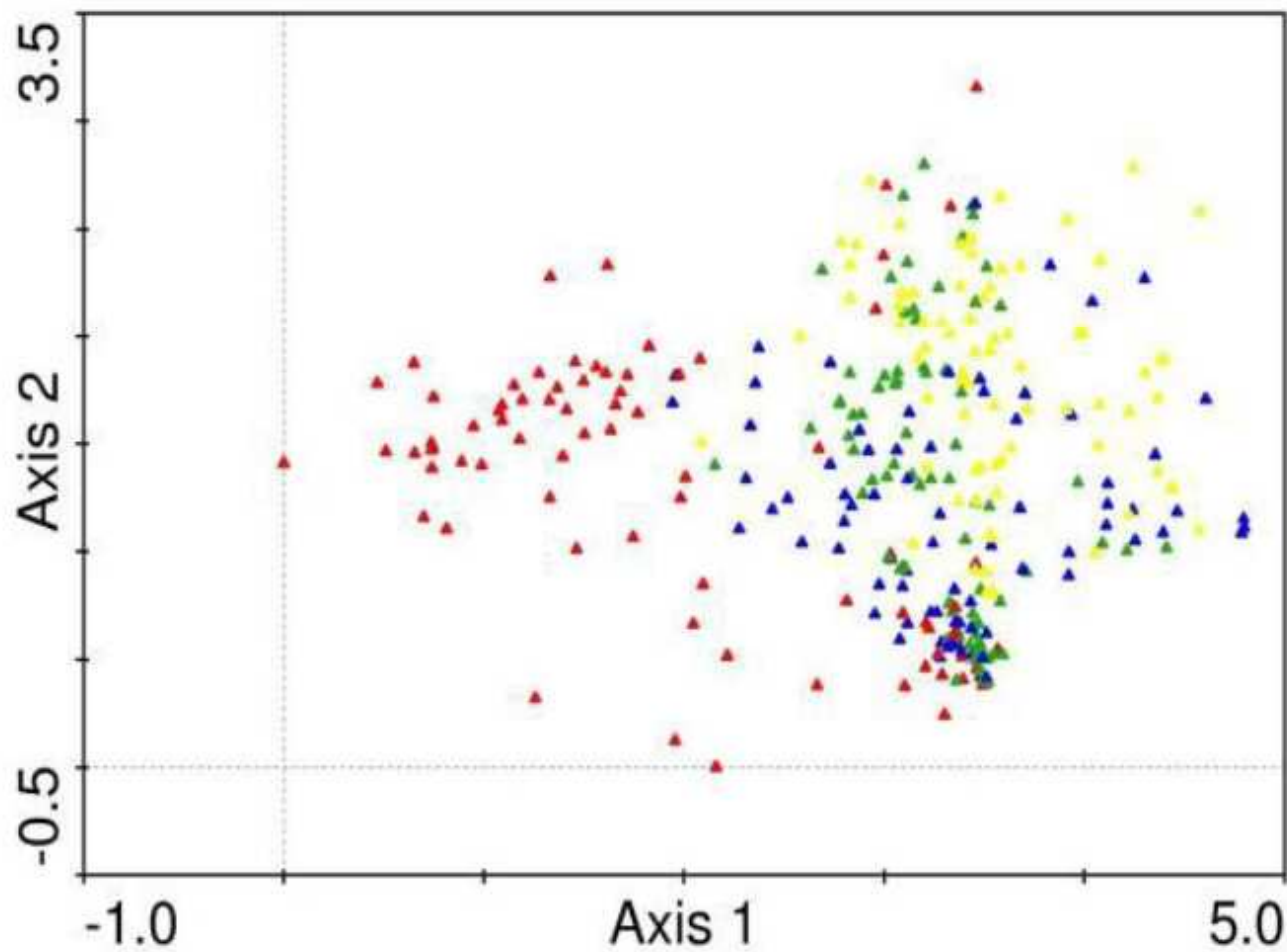Before removal of invasive species in Fort Rodd Hill National Historic Site

© Parks Canada

After removal of invasive species in Fort Rodd Hill National Historic Site

© Parks Canada

Evaluation

Planning exercice

Take the same example than exercise 1 – a prioritized location to restore in your country

▸ Develop realistic ecosystem goals and prepare a list of objectives to achieve them

▸ Describe actions to implement to achieve each objective

▸ Describe performance standards and monitoring protocols

Prepare (20-30 min) and present to the group