

# Landscape River Restoration

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# Landscape Restoration

- **European Landscape Convention.** *Florence, 2000*
- **Concepts and Ideas**
- **Landscaping Considerations for Urban Stream Restoration Projects**
- **The Ecological Restoration Projects: *planning, developing and evaluating***



# Landscape Restoration

## European Landscape Convention

*Florence, 20.X.2000*

*Spain (1 march 2008)*

### Preamble

**Considering that the aim of the Council of Europe is to achieve a greater unity between its members for the purpose of safeguarding and realising the ideals and principles which are their common heritage, and that this aim is pursued in particular through agreements in the economic and social fields;**

**Noting that the landscape has an important public interest role in the cultural, ecological, environmental and social fields, and constitutes a resource favourable to economic activity and whose protection, management and planning can contribute to job creation;**

**Aware that the landscape contributes to the formation of local cultures and that it is a basic component of the European natural and cultural heritage, contributing to human well-being and consolidation of the European identity;**

Acknowledging that the **landscape is an important part of the quality of life** for people everywhere: in urban areas and in the countryside, in degraded areas as well as in areas of high quality, in areas recognised as being of outstanding beauty as well as everyday areas;

Noting that developments in agriculture, forestry, industrial and mineral production techniques and in regional planning, town planning, transport, infrastructure, tourism and recreation and, at a more general level, changes in the world economy are in many cases accelerating the transformation of landscapes;

Wishing to respond to the public's wish to enjoy high quality landscapes and to play an active part in the development of landscapes;



## European Landscape Convention

*Florence, 20.X.2000*

### Preamble

Believing that the landscape is a key element of individual and social well-being and that its protection,

Having regard to the legal texts existing at international level in the field of protection and management of the natural and cultural heritage, regional and spatial planning, local self-government and transfrontier co-operation, in particular:

- the [Convention on the Conservation of European Wildlife and Natural Habitats](#)  
(Bern, 19 September 1979),*
- the [Convention for the Protection of the Architectural Heritage of Europe](#)  
(Granada, 3 October 1985),*
- the [European Convention on the Protection of the Archaeological Heritage \(revised\)](#)  
(Valletta, 16 January 1992),*
- the [European Outline Convention on Transfrontier Co-operation between Territorial Communities or Authorities](#)  
(Madrid, 21 May 1980) and its additional protocols,*
- the [European Charter of Local Self-government](#)  
(Strasbourg, 15 October 1985),*
- the [Convention on Biological Diversity](#)  
(Rio, 5 June 1992),*
- the [Convention concerning the Protection of the World Cultural and Natural Heritage](#)  
(Paris, 16 November 1972),*
- and the [Convention on Access to Information, Public Participation in Decision-making and Access to Justice on Environmental Matters](#)  
(Aarhus, 25 June 1998);*



## European Landscape Convention

*Florence, 20.X.2000*

### Preamble

Acknowledging that the quality and diversity of European landscapes constitute a common resource, and that it is important to co-operate towards its protection, management and planning;

**Wishing to provide a new instrument devoted exclusively to the protection, management and planning of all landscapes in Europe,**

Have agreed as follows:



## European Landscape Convention

*Florence, 20.X.2000*

### Definitions

**a "Landscape" means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors;**

b "Landscape policy" means an expression by the competent public authorities of general principles, strategies and guidelines that permit the taking of specific measures aimed at the protection, management and planning of landscapes;

c "Landscape quality objective" means, for a specific landscape, the formulation by the competent public authorities of the aspirations of the public with regard to the landscape features of their surroundings;

d "Landscape protection" means actions to conserve and maintain the significant or characteristic features of a landscape, justified by its heritage value derived from its natural configuration and/or from human activity;

**e "Landscape management" means action, from a perspective of sustainable development, to ensure the regular upkeep of a landscape, so as to guide and harmonise changes which are brought about by social, economic and environmental processes;**

f "Landscape planning" means strong forward-looking action to enhance, restore or create landscapes.



## European Landscape Convention

*Florence, 20.X.2000*

### General measures

Each Party undertakes:

- a. to recognise landscapes in law as an essential component of people's surroundings, an expression of the diversity of their shared cultural and natural heritage, and a foundation of their identity;
- b. to establish and implement landscape policies aimed at landscape protection, management and planning through the adoption of the specific measures **(RESTORATION)**
- c. to establish procedures for the participation of the general public, local and regional authorities, and other parties with an interest in the definition and implementation of the landscape policies mentioned in paragraph b above;
- d. to integrate landscape into its regional and town planning policies and in its cultural, environmental, agricultural, social and economic policies, as well as in any other policies with possible direct or indirect impact on landscape.



## European Landscape Convention

*Florence, 20.X.2000*

### Specific measures

#### *A Awareness-raising*

Each Party undertakes to increase awareness among the civil society, private organisations, and public authorities of the value of landscapes, their role and changes to them.

#### *B Training and education*

Each Party undertakes to promote:

- a** training for specialists in landscape appraisal and operations;
- b** multidisciplinary training programmes in landscape policy, protection, management and planning, for professionals in the private and public sectors and for associations concerned;
- c** school and university courses which, in the relevant subject areas, address the values attaching to landscapes and the issues raised by their protection, management and planning.

#### *C Identification and assessment*

#### *D Landscape quality objectives*

#### *E Implementation*



## European Landscape Convention

*Florence, 20.X.2000*

### Specific measures

#### *A Awareness-raising*

#### *B Training and education*

#### *C Identification and assessment*

- 1** With the active participation of the interested parties, as stipulated in Article 5.c, and with a view to improving knowledge of its landscapes, each Party undertakes:
  - a** to identify its own landscapes throughout its territory;
  - b** to assess the landscapes thus identified, taking into account the particular values assigned to them by the interested parties and the population concerned.
- 2** These identification and assessment procedures shall be guided by the exchanges of experience and methodology, organised between the Parties at European level

#### *D Landscape quality objectives*

*Each Party undertakes to define landscape quality objectives for the landscapes identified and assessed, after public consultation in accordance with*

#### *E Implementation*

*To put landscape policies into effect, each Party undertakes to introduce instruments aimed at protecting, managing and/or planning the landscape.*



## European Landscape Convention

*Florence, 20.X.2000*

### European Co-Operation

#### International policies and programmes

Parties undertake to co-operate in the consideration of the landscape dimension of international policies and programmes, and to recommend, where relevant, the inclusion in them of landscape considerations.

#### Transfrontier landscapes

The Parties shall encourage transfrontier co-operation on local and regional level and, wherever necessary, prepare and implement joint landscape programmes.

#### Monitoring of the implementation of the Convention

# Landscape Restoration

- European Landscape Convention. *Florence, 2000*

- Concepts and Ideas**

- Landscaping Considerations for Urban Stream Restoration Projects

- The Ecological Restoration Projects: planning, developing and evaluating

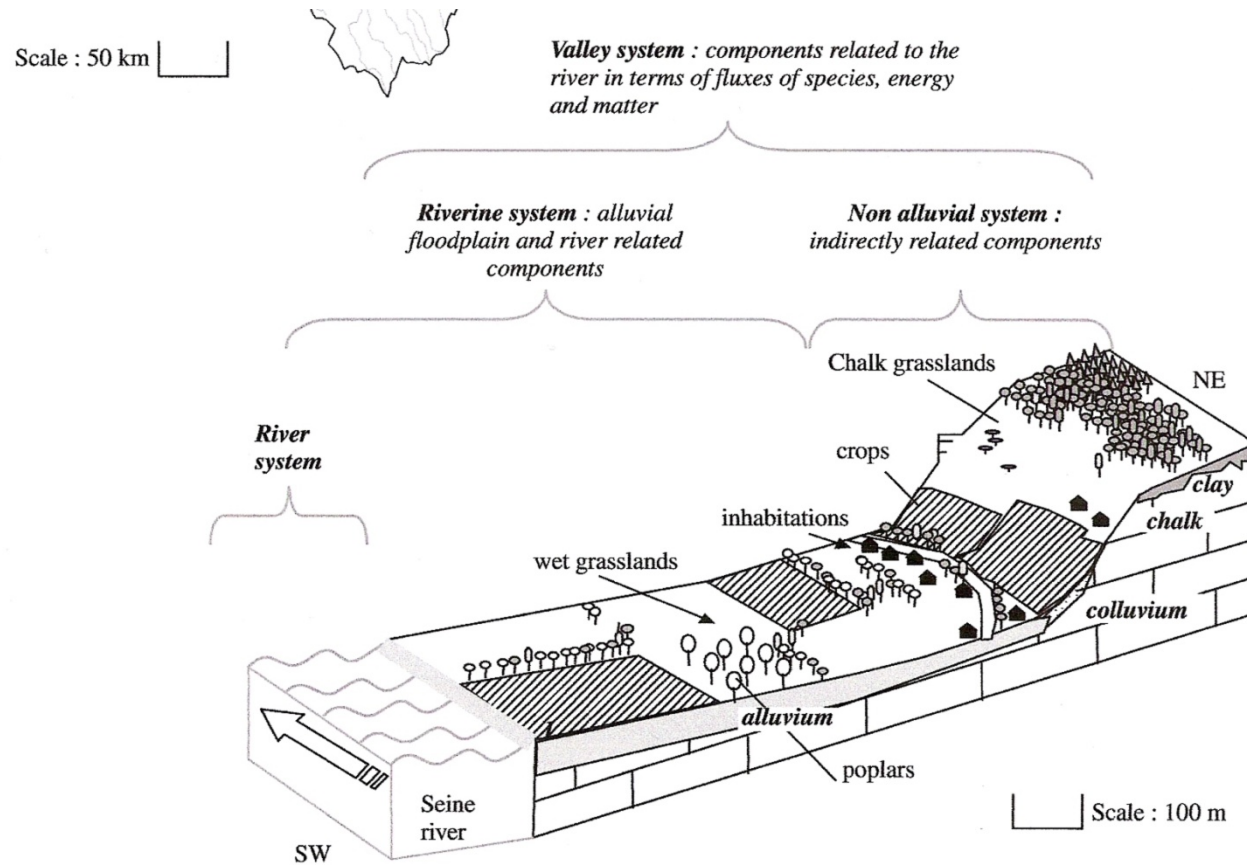


Figure 1. A schematic diagram of the valley floor of the Seine river, 20 km west of Rouen. The Seine basin is shown in the inset

## **Concepts Works and Ideas**

### **A.- Ecological Restoration**

### **B.- Landscape Restoration**

## A:- Ecological Restoration

### Concepts Works and Ideas

#### Three components of landscape:

Increasingly, people recognize that landscape is more than a visual impression alone and that our responses are more than some form of aesthetic appreciation or evaluation. It is useful to define the landscape in terms of three components:

natural;	that is the landform, rocks, vegetation, water, wildlife which originally made up the land and its ecosystem;
human influences;	the management and alteration of vegetation and landforms, creation of buildings and structures;
aesthetic qualities;	concerned with the reaction of the mind to what the eye sees; the patterns presented in terms of, for example, shape, colour, texture and scale.

Our perception of the landscape is influenced very much by our emotions, education, culture and experiences. While each of us has our own unique way of looking at a landscape, this variation tends to be set within a general view or norm for sections of society.

## A:- Ecological Restoration

A **team of ecological economist stimated the annual worth of natural goods and services to exceed the gross world product (Costanza et al 1997).** Although consensus has no emerged as to the validity of their valuation methods, their study demostrates that the benefits of natural capital to an economy or society are enormous.

Even more enormous is the cost of recovering natural capital when it has been lost or impaired, thereby warranting is continued protection.

Any action that degrades, damages, or destroys ecosystems will reduces natural capital and thus the output of **naturlgoods and services.**

## A.- Ecological restoration

**The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed**



## A.- Ecological restoration



***River Quaggy reconnected to its floodplain***

## B.- Landscape Restoration



## B.- Landscape Restoration



*Site under construction*

## ***Constrained Heathrow terminal***



*Site integration landscape  
(more or less)*

## B.- Landscape Restoration

## Landscape

Area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.

### LANDSCAPE UNIT

UNIDAD DE PAISAJE

The areas will be identified by studying the composition and patterns of elements within each landscape

### SCENE

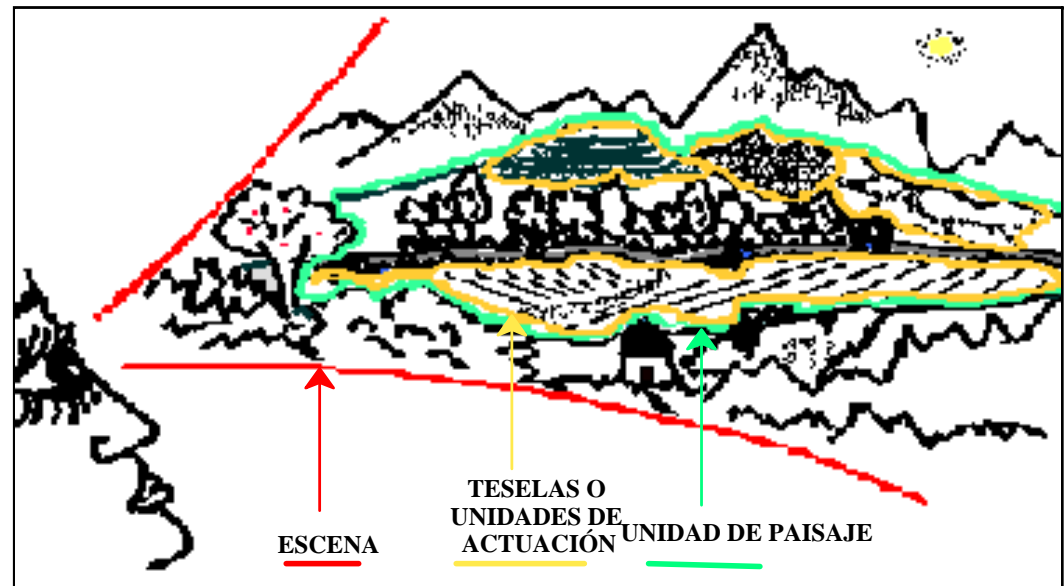
ESCENA

View

### TESELA or actuation unit

TESELA o UNIDAD DE ACTUACION

Homogeneous actuate area



Viewshed

(Cuenca visual)

## B.- Landscape Restoration

### B.- Landscape Restoration

Landscape improvement areas are those areas that are not identified as habitat restoration areas but where planting is desired.

Landscape improvement areas typically include areas around buildings, natural open space areas, grass areas not used as sports fields, roadways, specialty gardens, and planned beautification areas.

#### Rationale for Hydrologic Restoration

Hydrologic restoration is a necessary beginning to ecological restoration. Other restoration efforts that undoubtedly will be necessary include reduction in both waterborne and airborne inputs of plant nutrients and contaminants, control of invasive introduced species, and reestablishment of natural corridors in uplands and wetlands for native biotic dispersal and diversity. Hydrologic restoration may enhance the effectiveness of other restoration measures like **landscape**.

## **B.- Landscape Restoration**

**Must provides native plant materials to support efforts by campus and community groups and private landowners to restore Palouse Prairie, riparian corridors, wetlands, woodland communities, and other sustainable and naturalized habitats, such as rain-fed gardens and urban xeriscaping. As the nursery expands its living collection of plants, it will support the conservation and restoration of several rare plant species.**

### **Restoring Landscapes**

**Must provides technical assistance to agencies, businesses, communities, and individuals wishing to restore native and naturalized habitats and wildlife populations on their lands. Faculty and student teams conduct field assessments to design and implement appropriate restoration plans for a given site and landscape.**

## B.- Landscape Restoration

Many times “The Landscape Restoration Programs” is dedicated to restoration of native species, healthy and diverse ecosystems, and natural evolutionary processes.

This programs are designed in cooperation with government agencies and landowners to decrease **habitat fragmentation** and **restore watersheds**.

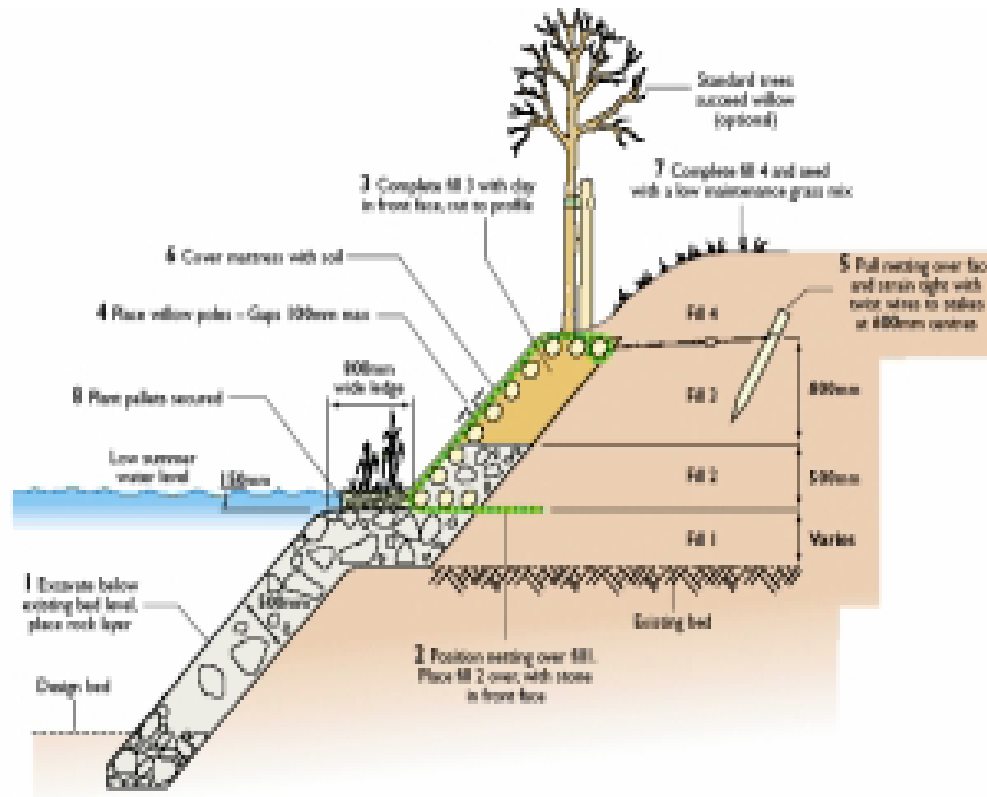


Planting the constructed floodplain,  
Carmel River Schulte Rd project

## B.- Landscape Restoration

### Landscape Restoration: Works

*Diagram showing willow mattress technique construction*



These techniques were developed to suit site specific criteria and may not apply to other locations

## Planting the constructed floodplain, Carmel River Schulte Road Project



## B.- Landscape Restoration

- Degradation and catastrophe problems of natural landscapes.
- Variables (pattern, soil, vegetation, site ecology etc.) that promote degradation.
- Planning interventions at the landscape.
- Reclamation of degraded landscapes.
- Future land uses. Visual analysis.
- Landscape vulnerability and absorption capacity.
- Synthesis and presentation of reclamation plan.
- Selection of the most suitable plant species.
- Preparation and presentation of individual or groups of students.

### References:

*Ispikoudis I.* (1981). Reclamation and use of degraded areas. Aristotle University of Thessaloniki Forest Department Scientific Publications. Volume 24, No 1. pp. 23-90. (In Greek)

*Darmer G.* 1992. Landscape and surfacing mining: ecological guidelines for reclamation. Van Nostrand Reinhold, 200 p.

*Dunnet N., Hitchmough J.* 2003. The dynamic landscape: design and ecology of landscape vegetation. Spon Press/Routledge. London



## RiverRestoration.org

A simple approach to restoration

## Landscape Restoration

**RiverRestoration.org** is dedicated to resolving River issues. RiverRestoration.org provides the creative planning, engineering and technical support required in any successful river project. Our philosophy is to take a whole system approach to river projects to meet the multiple needs of ecology, recreation and water users for an overall higher functioning system. We identify degradations, uncover use issues and site constraints, and find solutions that benefit the whole system.

The mission of RiverRestoration.org achieve an overall higher function for river systems.

Our goals: is to bring together diverse river interests and create a whole system approach for restoration, preservation, enhancement and beneficial use of riverine and riparian ecosystems. We do this by inspiring communities, water users, recreation users and ecologic interests in finding solutions that

- Restore, enhance and preserve the river environment
- Develop and implement Best Management Practices
- Inspire new river stewards
- Assist in community development of sensitive waterways
- Enhance natural recreation opportunities and passive enjoyment of the waterway

**Technical Support:** RiverRestoration.org has the engineering expertise and technical capacity to perform tasks ranging from Bridge Scour Analysis to Floodplain Delineation. We perform hydrographic survey and channel investigations. We are trained and practiced in sediment transport, geomorphology, watershed science, and open channel hydraulics. We combine these scientific skills with creative approaches and new thinking for our Rivers.



## Three Years of Natural Recovery

## B.- Landscape Restoration



The project has been extremely successful. Bedforms and particle size distributions of the riffle crests evolved within the first winter. Feedbacks between the self-sown bank vegetation and river bank profiles occurred within 2 years rather than the 10+ years that were anticipated. Aquatic vegetation was well established within three years.

A diverse vegetation has colonised the banks as a result of transport of seeds and vegetative propagules from upstream. Despite an extensive cover of the alien invasive species, *Himalayan balsam*, immediately upstream of the restoration site, there has been no significant development of this species within the study reach. Instead the diverse vegetation covering the evolving banks is comprised of largely native species.

## B.- Landscape Restoration

### **HIMALAYAN BALSAM**

*(Impatiens glandulifera)*



Himalayan balsam is a bamboo-like annual with characteristic flowers resembling the shape of an English “Policeman’s helmet” (one of its common names). It is native to the Western Himalaya, most likely brought to Canada in the early 1900’s as an ornamental

**This plant is extremely invasive to moist, natural areas and is swiftly spreading through the watercourses of the Lower Mainland.**

Himalayan Balsam can grow to three meters, which combined with its high reproductive output and rapid growth enables this weed to dominate local vegetation. Additionally, after dying back in the fall, it exposes bare riverbanks resulting in increased erosion during high winter flows.

Himalayan balsam has a poor root structure so it is relatively easy to pull by hand. Controlling this plant, like many invasives, requires stringent and long term efforts to be effective.

Himalayan balsam is easily identifiable with its whorled leaves (usually in threes)



## Riparian Trees along Semi-Natural Rivers

Researchers  
[Professor Angela Gurnell](#) and [Dr Robert Francis](#), Department of Geography;

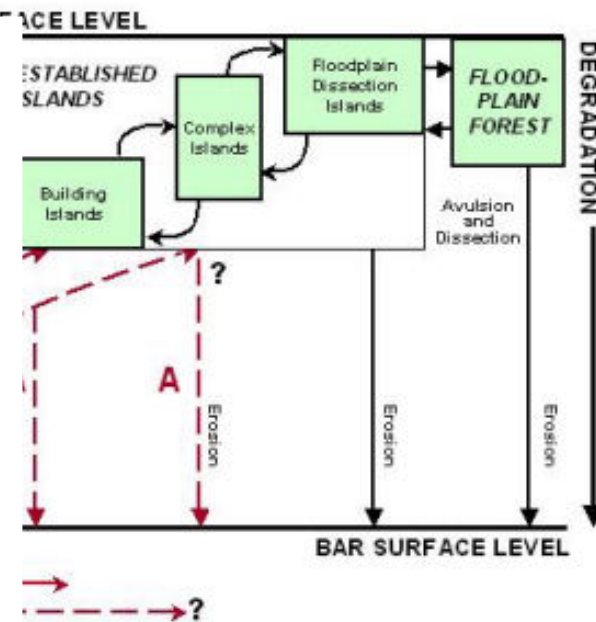
Research Partners  
Professor Klement Tockner, EAWAG, Professor Peter Edwards, Geobotanical Institute, Dr Paolo Perona, Institute of Environmental Engineering, ETH, Zurich, Switzerland  
Professor Geoffrey Petts, University of Birmingham

A model of island dynamics has been proposed, based upon research on the 'pristine' Fiume Tagliamento, Italy.

The model incorporates different island types and trajectories of development in response to interactions between wood debris, living vegetation, sediment calibre, erosion and deposition.

This project investigates the influence of alpine, transitional and mediterranean environmental contexts and reach hydraulic characteristics on the nature and trajectories of island dynamics as a basis for tailoring

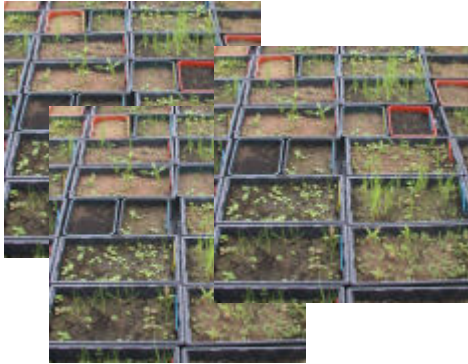
The model to specific environments and providing an input to riparian vegetation management along more impacted systems.



es the most rapid shoot (and root)  
o is the most likely to lead to  
and development  
ne is unlikely to lead to island  
development

## Vegetation trapping of fine sediment: I

### Interactions between vegetation and sediment



Researcher

[Professor Angela Gurnell](#), Department of Geography  
Research Partners

Dr Joanne Goodson, Entec

Professor Nick Clifford, University of Nottingham

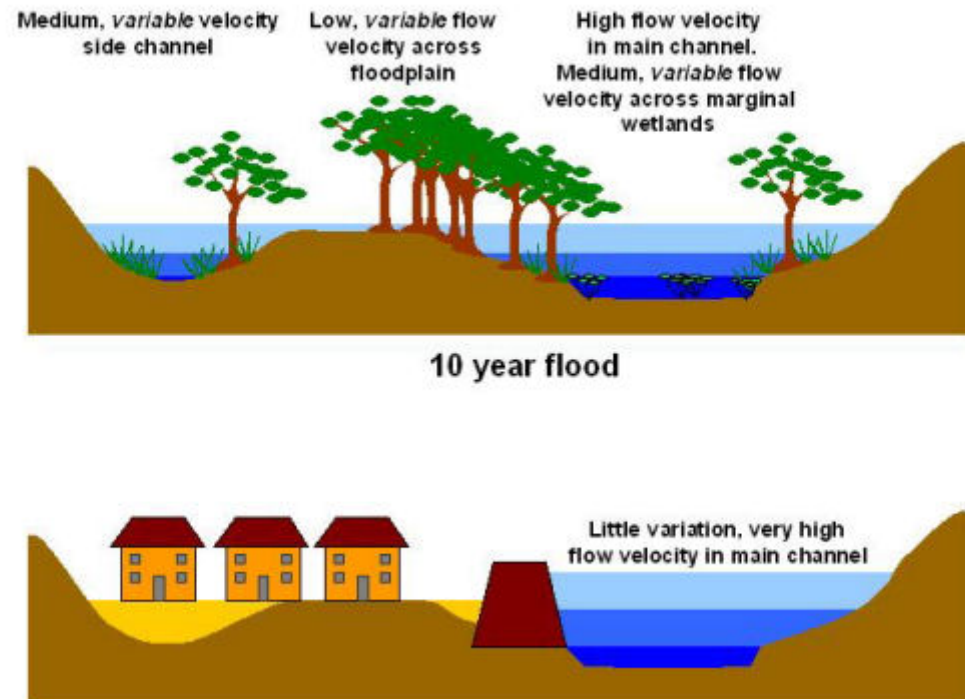
Dr Ken Thompson, University of Sheffield

Owen Mountford, CEH

This NERC-funded project investigates interactions between vegetation, river flows, and sediment / vegetation propagule dynamics in complex, groundwater-fed rivers.

It aims to identify how vegetation growth influences fine sediment and organic matter retention in these channels, the feedbacks this has on landform and vegetation development, and the implications these have for physical habitat dynamics and diversity.

## Connectivity and Complexity



### People Participation in the Landscape Restoration of the Mae Ping River in Chiang Mai Municipality

<b>Author</b>	Mr. Wichai Sakuna
<b>M.A.</b>	Man and Environmental Management

<b>Examining Committee</b>	Assoc. Prof. Prayad Pandee	<b>Chairman</b>
	Prof. Dr. Manat Suwan	<b>Member</b>
	Assoc. Prof. Dr. Anurak Panyanuwat	<b>Member</b>

The purposes of this research were to study:

- (1) needs of people to participate in the landscape restoration of the Mae Ping River;
- (2) needs of community's leaders to participate in the landscape restoration of the Mae Ping River; and
- (3) factors influencing participation in the landscape restoration of the Mae Ping River from the people who located in the landscape of the Mae Ping River.

The sample group for this survey research consisted of 228 people who lived along the landscape of the Mae Ping River in Chiang Mai municipality.

Questionnaires were used in data collection.

## B.- Landscape Restoration

## B.- Landscape Restoration

The results of the research showed that numbers of male and female were not much different, and most of them had occupations as employees and business people. Most of them wanted to participate in community work on the condition that the community's leaders, municipality executives, monks and people had to participate in the landscape restoration in the Mae Ping River.

Two important factors affecting the level of participating

**Firstly**, the personal factors, which were their duration of housing establishment, did not affect the people's opinions and decision of participation.

Such factors may be viewed as that:

- (1) their living duration nearby the Mae Ping River did not have any affect upon the people's opinions and participation level;**
- (2) their housing locations toward the developed landscape restoration areas and non-developed areas had a significant difference of their opinions and decisions of participation; and**
- (3) the different level of perception toward the landscape restoration did not affect their opinions and participation significantly.**

**Secondly**, the external factors consisted of freedom, capability, agreement and opportunity which influenced the people's opinions and decision to participate in the landscape restoration of the Mae Ping River.

The other related factors, that highly initiated a high degree of development participation with success, consisted of free time from routine work, involvement with small amount of payment or without any payment.

# Landscape Restoration

- European Landscape Convention. *Florence, 2000*
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- The Ecological Restoration Projects: planning, developing and evaluating

## Landscaping Considerations for Urban Stream Restoration Projects

### OVERVIEW AND PURPOSE

**Many restoration projects are implemented in urban environments, where the landscape and environmental conditions have been sufficiently altered that true restoration aimed at achieving “natural” functions is limited and the reconstruction of pre-impact form is impossible.**

Under these circumstances, and in many cases where such constraints do not exist, the success of a project – as viewed by the public – is often based largely on the **visual appeal** of the site after restoration and its functionality for public use.

The landscaping component of such stream and riparian restoration projects must be emphasized given its importance of visual success and public perception. The purpose of this technical note is to address landscaping considerations associated with urban stream and riparian restoration projects, and provide ideas to managers for enhancing the visual appeal and aesthetic qualities of urban projects

## Landscaping Considerations for Urban Stream Restoration Projects

### LANDSCAPE DESIGN PRINCIPLES

- unity,
- balance,
- sequence,
- proportion,
- rhythm,
- accent,
- repetition,
- variety

**Create the Composition of the design**

### VISUAL ELEMENTS:

- color,
- line,
- form,
- mass,
- texture,
- scale,
- light,
- Time

tools which are used in combinations to adjust **design principles**.

This interplay of **design principles** and **visual elements** yields a design for a specific site that fulfils the intended purpose of the design.

## LANDSCAPE DESIGN PRINCIPLES

- Unity,

**It is obtained by the effective use of components in a design to express a main idea through consistent style.**

1. Unity is emphasized by consistency of character between units in the landscape.
2. Use of elements to express a specific theme within units creates harmony.
3. Unity can be achieved by using mass planting and repetition.
4. Unity means that all parts of the composition or landscape go together; they fit.
5. A natural feeling evolves when each activity area belongs to and blends with the entire landscape.

## LANDSCAPE DESIGN PRINCIPLES

- Balance

Asymmetrical balance uses different forms, colors and textures to obtain balance of visual attraction.

These opposing compositions on either side of the central axis create equal attraction.

For example, mass may be opposed by color or linear dimension by height.

## LANDSCAPE DESIGN PRINCIPLES

(Figure 7).

- Sequence,

**Transition is gradual change. Transition in color**

1. Can be illustrated by the radial **sequence** on the **color wheel** (monochromatic color scheme)

2. Transition can be obtained by the arrangement of objects with varying textures, forms, or sizes in a logical sequential order.

**For example, coarse to medium to fine textures, round to oval to linear structural forms, or cylindrical to globular to prostrate plants.**

## VISUAL ELEMENTS:

### The Color Wheel



#### PRIMARY COLORS

Red, yellow and blue

In traditional color theory, these are the 3 pigment colors that can not be mixed or formed by any combination of other colors.

All other colors are derived from these 3.



#### SECONDARY COLORS

Green, orange and purple

These are the colors formed by mixing the primary colors.



#### TERTIARY COLORS

Yellow-orange,  
red-orange, red-purple,  
blue-purple, blue-green  
and  
yellow-green.

These are the colors formed by mixing a primary and a secondary color. That's why the hue is a two word name, such as blue-green, red-violet, and yellow-orange.

## LANDSCAPE DESIGN PRINCIPLES

(Figure 7).

- Sequence,

**Transition is gradual change. Transition in color**

An unlimited number of schemes exist by combining elements of various **size, form, texture and color to create transition.**

Remember, **transition** refers to the 3-dimensional perspective of composition, not just the flat or facial view.

It is possible to use **transition** to extend visual dimensions beyond actual dimensions.

For example, radical lines in the private area of the landscape can be used to enframe and/or focalize a lake scene. Transition of plant materials along these lines can make the scene become a part of the landscape.

***Transition** from taller to shorter plants with textural changes from coarse to fine along focal lines emphasizes the beauty of a lake scene.*

***Transition** from shorter to taller plants and from fine to coarse textures would en frame the scene and make it appear closer, like a painting on a wall.*

*Generally, **transition** assists in the gradual movement of a viewer's eye to the design and within it.*

## LANDSCAPE DESIGN PRINCIPLES

- Rhythm,

It is achieved when the elements of a design create a feeling of motion which leads the viewer's eye through or even beyond the designed area.

Tools like color schemes, line and form can be repeated to attain rhythm in landscape design. Rhythm reduces confusion in the design.

## LANDSCAPE DESIGN PRINCIPLES

### Figure 9

- Proportion,

**Refers to the size of parts of the design in relation to each other and to the design as a whole.**

1. One large towering oak may compliment an office building but would probably dwarf a single story residence
2. A three-foot pool would be lost in a large open lawn but would fit beautifully into a small private area.
3. And of course, a colossal fountain would dominate a private garden but could enhance a large city plaza.

## LANDSCAPE DESIGN PRINCIPLES

- Accent,

**Focalization** involves the leading of visual observation toward a feature by placement of this feature at the vanishing point between radial or approaching lines

Straight radial lines create a strong focalization when compared to curved lines.

The viewer's eye is quickly forced along straight lines to a focal point.

Generally, weaker or flowing lines of focalization are desirable in the Basic Principles of Landscape Design residential landscape.

Transition of plants or other objects along these lines can strengthen or weaken the focalization.

Curved lines are stronger when curved toward each other than when curved outward.

Indirect focalization is created by lines curved in the same direction.

Focalization can be adjusted by plant materials along the lines to create symmetrical or asymmetrical focalization.

## LANDSCAPE DESIGN PRINCIPLES

- Accent,

**Focalization** involves the leading of visual observation toward a feature by placement of this feature at the vanishing point between radial or approaching lines

Focalization can be used to direct attention to a point, traffic in an area is usually directed to that point.

Focalization could be used to direct traffic in a garden area.

Guidance of view toward features of commercial, aesthetic or cultural value may attract the eye of the unaware without conscious effort.

## LANDSCAPE DESIGN PRINCIPLES

- Repetition,

- Variety

**Repetition refers to the repeated use of features** like plants with identical shape, line, form, texture and/or color.

Too much repetition creates monotony but when used effectively can lead to rhythm, focalization or emphasis.

**Unity** can be achieved better by no other means than repetition.

**Simplicity goes hand-in-hand with repetition and** can be achieved by elimination of unnecessary detail.

Too much variety or detail creates confusion of perception.

**Simplicity is the reduction of a design to its simplest,** functional form, which avoids unnecessary cost and maintenance.

## Landscaping Considerations for Urban Stream Restoration Projects

### LANDSCAPE DESIGN PRINCIPLES

#### CONCLUSION

A successful urban stream restoration project can improve the communities' environmental awareness, while offering recreational opportunities.

The vegetative buffer can provide privacy, noise control, bank stabilization, aesthetics, and increase real estate values and wildlife habitat.

For managers, it provides a low maintenance opportunity to utilize an urban stream that otherwise may not have been viewed as a valuable component of the landscape.

## Landscaping Considerations for Urban Stream Restoration Projects

### LANDSCAPE DESIGN PRINCIPLES

Attention to landscaping details for urban stream restoration projects can:

- Improve environmental awareness.
- Offer recreational opportunities.
- Provide privacy and noise control.
- Enhance visual appeal.
- Accentuate or diminish adjacent land uses.
- Minimize maintenance.
- Increase value of real estate.

## Landscaping Considerations for Urban Stream Restoration Projects

## LANDSCAPE DESIGN PRINCIPLES

### STEPS IN DEVELOPING A LANDSCAPE DESIGN

The benefits of an organized system in developing a landscape design are tremendous.

The plan for the landscape designer should follow a sequence such as the one presented here:

#### **Steps In Design**

**1. Develop a plot plan.**

**2. Conduct a site analysis.**

**3. Locate activity areas.**

**4. Design activity areas.**

**5. Plant selection and placement.**

# Landscape Restoration

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## The Ecological Restoration Projects: planing, developing and evaluating

### CONCEPTUAL PLANNING

**Identify the project site location and its boundaries.**

**Identify ownership.**

**Identify the need for **Ecological and Landscape Restoration**.**

**Identify the kind of ecosystem to be restored.**

## The Ecological Restoration Projects: planing, developing and evaluating

### **ONONDAGA CREEK CORRIDOR STUDIES** STUDIO IN LANDSCAPE & URBAN ECOLOGY

Faculty of Landscape Architecture  
SUNY College of Environmental Science & Forestry  
Prf. Emmanuel Carter and graduate students



## The Ecological Restoration Projects: planing, developing and evaluating

### CONCEPTUAL PLANNING

- Identify physical site conditions in need o repair.**
- Identify stressors in need of regulation or re-initiation.**
- Identify and list the kinds of biotic interventions that are needed**
- Identify landscape restrictions.**
- Identify project-funding sources.**
- Identify labor sources and equipment needs.**
- Identify biotic resource needs and sources.**
- Identify the need for securing permits required by government agencies.**
- Identify permit specifications, deed restrictions, and other legal constraints.**
- Identify project duration.**
- Identify strategies for long-term protection and management.**

## B.- Landscape Restoration

At the lower portion a series of new retail, dining and entertainment venues will be developed alongside new residences following the newly adopted zoning for this area. At this point the creekwalk will extend to the Onondaga Lakefront and connect with the proposed 'Loop the Lake' trail system.

### Armory Square Onondaga Creek Improvement Project

The Armory Square segment of the Onondaga Creekwalk offers an opportunity to expand and enhance one of the most vibrant areas in downtown Syracuse. The creek runs along the western edge of the Armory area, mostly bordering on surface parking lots, and nearby rendering it visible. The proposed re-design is aimed at spotlighting the creek while extending the boundaries of what is considered Armory Square. By removing the parking lot between The Mast and Onondaga Creek, it becomes possible to create an urban oasis of green and of culture in the form of a sculpture park. This park will serve as an urban promenade, and an outdoor lunchroom spot for employees and patrons of the surrounding restaurants and businesses. In keeping with the current atmosphere in Armory Square, this will be a gathering place to see and be seen.

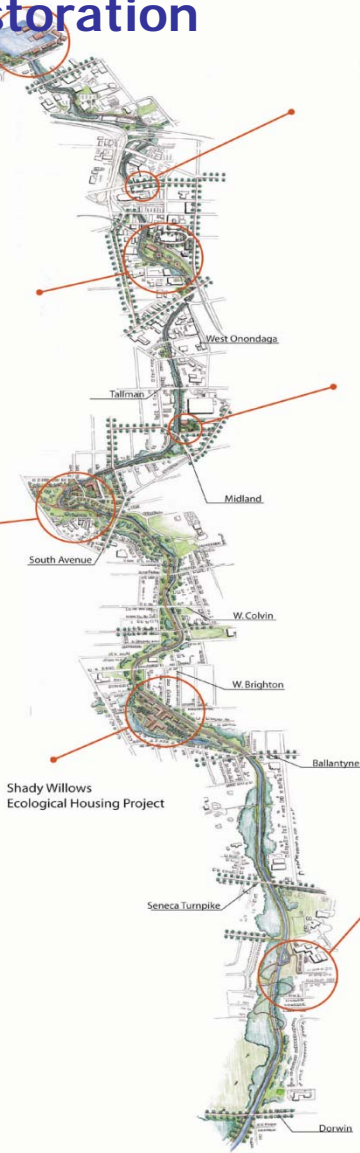
### Onondaga Point Ecological Housing Project

The mission of the Ecological Housing projects, located at Shady Willows and at Onondaga Point, is to explore a variety of innovative housing solutions that allow these developments to be more self-sufficient. Energy conscious materials as well as design principles will combine to enable these facilities to produce more energy than they consume.

Shared community facilities such as greenhouses and solariums, and outdoor community garden areas will give residents the opportunity to grow their own food for much of the year. The solariums will act as heat sinks in the winter time to assist in keeping the residences warm.

These projects will be oriented towards the creek and will provide extra amenities for alternative transportation modes such as bicycling and public transportation. Access to the creekwalk will allow residents to commute to work and recreate throughout the year.

These projects will also incorporate innovative storm water management and waste water treatment techniques that keep the water working on site in retention basins as well as through grey water recycling mechanisms. Solar aquatic wastewater treatment systems will be utilized to handle sanitary waste using biological processes and highlighting the application of plant materials.



### Niagara Mohawk Green Building Project

One of the biggest challenges to the creation of the creekwalk is the location of one of Niagara Mohawk's buildings where Onondaga Creek flows under Erie Boulevard. The proposal for this location is to transform the existing building into a demonstration project for the Niagara Mohawk utility that highlights energy conscious design. The design of the facility will include extensive daylighting, allowing for natural light to penetrate the interior of the building. Where the building crosses over Onondaga Creek the floors will be transparent and allow for sunlight to reach the surface of the water and add a feeling of openness to the creekwalk at this location.

### Midland Ave Onondaga Creek Improvement Project

The Midland Facility will house treatment technology to remedy the combined sewer overflows, which have so polluted Onondaga Creek. The currently proposed technology is hotly contested, but there is community consensus that the sewer overflows must be addressed in some manner. For the purposes of this design, the Midland site has been designated a CSO treatment facility, but the type of treatment technology has not been specified. Instead, the design is focused on infusing the landscape with amenities for the surrounding community. The Midland landscape will provide recreational opportunities for all ages including a tot or playground area, basketball courts, water play structures, gentle sliding slopes, and a system of paths and benches for strolling and simple outdoor relaxation.

### Shady Willows Ecological Housing Project

### Ecological Education Center at Clary Middle School

Every child has a naturalist. His eyes are by nature open to the glories of the stars, the beauty of the flowers, and the mystery of life.

The mission of the ecological education center is to create a place that informs students and the public about stream ecology and surrounding plant communities. The center will provide native habitat for wildlife, an outdoor classroom for students and teachers at area schools, and a point of interest along the creekwalk. One of the features of the center is an interpretive trail that follows the creek's original alignment. It will lead visitors through several types of riparian plant communities, and kiosks located strategically along the trail will enlighten users of the processes taking place and the wildlife living within them. Another feature is an outlet or extending branch of the creek that creates habitat for wildlife such as fish, frogs, and turtles, as well as a place for children to safely learn and interact with the creek. Learning gardens will also be included in a place where students can watch their plants grow and encourage wildlife visitors such as butterflies and hummingbirds. The ecological education center will become a place where the community can come to learn about, understand, and support Onondaga Creek.

The Ecological Restoration Projects:  
planning, developing and evaluating

# The Ecological Restoration Projects: planing, developing and evaluating

## Indicator Species

### Indicator Species

Fish, frogs, macro-invertebrates, plants and an array of other biotic features of Onondaga Creek can be observed to determine the health of the stream. For example, the white sucker (*Catostomus commersoni*), common reed (*Phragmites australis*) and purple loosestrife (*Lythrum salicaria* L.) are very tolerant of highly polluted water. These species indicate a poor quality aquatic and riparian ecosystem. Watershed protection programs improve water quality and therefore provide an unsuitable habitat for invasive species and provide a more natural habitat for native plants and animals.

Indicator species give some insight into the current ecological and biological conditions of the creek, and can help in the creation of a more ecologically sound environment.

### Existing Species along Onondaga Creek



Common Reed  
(*Phragmites australis*)



Purple loosestrife  
(*Lythrum salicaria* L.)



White sucker  
(*Catostomus commersoni*)

Pool dwelling species. Length 12"-20". Most of Canada, south to New Mexico, Arkansas, Alabama, and Georgia. Highly adaptable to differing habitats and changing environmental influences. It is relatively tolerant of turbid and polluted waters. Primarily a bottom feeder of aquatic insect larvae, small mollusks, crustaceans, and various terrestrial worms preferred. It will, however, take almost any food that is available.



Norway Maple  
(*Acer platanoides*)

These trees are pollution tolerant and are highly invasive due to their allelopathic features. (secretion of chemicals to dominate a certain area).

Both Common Reed (*Phragmites australis*) and Purple loosestrife (*Lythrum salicaria* L.) are introduced species that create a patch that grows on the edge of an aquatic system that prevents other species from growing and will eventually consume the aquatic system.

### Implications:

It is important to protect our watersheds because the overall benefits will range from biological improvements to social/ environmental improvements. The Onondaga Creek Watershed has been degraded through the years from industrial and agricultural practices. Watershed Protection Programs are designed to intergrate community participation and environmental awareness. Implementation of local watershed Protection Programs in Onondaga Creek will restore the water quality to a more sustainable and healthy aquatic and riparian ecosystem.

### Re-naturalization Of Onondaga Creek

Re-naturalization of parts of Onondaga Creek will help to improve water quality and that of the riparian environment. Wetlands, vegetated islands, boulders lending themselves to rapids and pools will, in the absence of combined sewer overflows, provide more and better habitats that are attractive to broader ranges of plants and animal life. The indicator species associated with improved aquatic and riparian conditions are shown on the next illustrative sheets.

**Onondaga Creek** Master Plan  
Syracuse, New York Team A

SUNY College of Environmental Science and Forestry  
Faculty of Landscape Architecture  
**Studio in Landscape and Urban Ecology Spring 2004**  
Professor Emanuel Carter and Dr. Maria Ignatieva  
Heather Carrington Jennifer Freudenburg Michael Gordon Samuel Gordon Karen McNamara Paulina Mohamed

# The Ecological Restoration Projects: planing, developing and evaluating

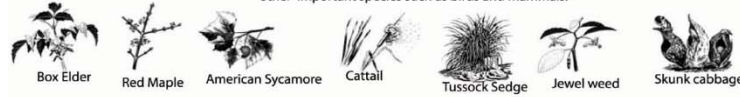
**Team A**  
 Heather Carrington  
 Jennifer Fredenburg  
 Samuel Gordon  
 Michael Gordon  
 Karen McNamara  
 Paulina Mohamed

## Indicator Species

### Future Indicator Species of Onondaga Creek

Indicator species Species That Would Reflect Ecological Improvements in Onondaga Creek's Riparian Zone.

**Trees, shrubs, wildflowers and plants-** Provides shelter and nesting sites for mammals and birds. Trees and shrubs also provide food and act as an attraction for other important species such as birds and mammals.



**Reptiles and Amphibians-** Diversity and the health of these organisms indicates a healthy aquatic and riparian zone because of their ability to absorb the chemicals in their physical environment through their skin.



**Birds-** Diversity of birds indicates a well vegetated area, where food and shelter are available.

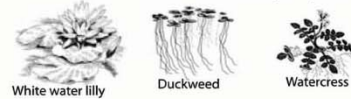


**Mammals-** Diversity of mammals indicates a healthy ecosystem. Mammals are at the top of the food chain therefore the their presence indicates other living food sources such as birds, reptiles amphibians and nuts from trees.



Indicator Species That Would Reflect Ecological Improvements in Onondaga Creek's Water Quality and Aquatic Life

**Wildflowers and plants-** In an aquatic environment, plants provide shelter and food for aquatic organisms. Plants also provide oxygen for the water which contributes to a healthy ecosystem.



**Invertebrates-** These organisms are very important in an aquatic ecosystem because they are a food source for fish, birds, amphibians and reptiles. Invertebrates are sensitive and a diverse, healthy population indicates good water quality.



**Fish-** Fish are great indicators of water quality. Increased diversity in species and population indicates a healthy aquatic environment. Fish are also a food source for birds and mammals.



**Reptiles and Amphibians-** These organisms indicate the same environmental qualities as the riparian species. However their habitat is primarily aquatic.



**Birds-** Indications are the same as the riparian species



**Mammals-** Indications are the same as the riparian species



## The Ecological Restoration Projects: planing, developing and evaluating

### CONCEPTUAL PLANNING

#### Identify restoration goals:

- Recovery of a degraded or damaged ecosystem to its former state.
- Replacement of an ecosystem that was entirely destroyed with one of the same kind.
- Substitution of another kind of ecosystem from the bioregion to replace one which was removed from a landscape that became irreversibly altered.
- Substitution of a replacement ecosystem where an altered environment can no longer support any naturally occurring type of ecosystem in the bioregion.
- Substitution of a potential replacement ecosystem, because no reference system exists to serve as a model for restoration.



## Goal 2 "Improve aesthetic quality along the corridor"

### Objectives:

- + Utilize plant signatures
- + Use continuous paving materials/base plain materials
- + Reconsider physical barriers to the creek
- + Create/emphasize nodal spaces along the creek
- + Incorporate public art along the corridor
- + Reconsider bridge architecture
- + Develop a vocabulary of landscape furnishings/fixtures
- + Allow for a gradation of experience between 4 zones and 4 seasons
- + Preserve/enhance viewsheds



# linkages & transitions

The Ecological  
Restoration  
Projects:  
planing,  
developing and  
evaluating

Proposed Corridor Characteristics For East Castle Street

Existing Conditions

Proposed Onondaga Street Characteristics

Mass Vegetation Plantings Proposed

Proposed Tree And Vegetation Upgrade

Proposed Street Tree Plantings And Vegetation Upgrade

Proposed Split Hwy For Colvin Street (main corridor, with a large canopy covered sidewalk)

## **The Ecological Restoration Projects: planing, developing and evaluating**

### **PRELIMINARY TASKS**

**Appoint a restoration practitioner who is in charge of all technical aspects of restoration.**

**Select the restoration team.**

**Prepare a budget to accommodate the completion of preliminary tasks.**

**To write the project: site conditions, the biota features , etc.**

**site history that led to the need for restoration.**

**Conduct pre-project monitoring as needed.**

**Establish the reference ecosystem or “reference”.**

## **The Ecological Restoration Projects: planing, developing and evaluating**

### **PRELIMINARY TASKS**

**Gather pertinent autecological information for key species.**

**Conduct investigations as needed to assess the effectiveness of restoration methods and strategies.**

**Decide whether ecosystem goals are realistic or whether they need modification.**

**Prepare a list of objectives designed to achieve restoration goals.**

**Secure permits required by regulatory and zoning authorities.**

**Establish liaison with interested public agencies.**

**Establish liaison with the public and publicize the project.**

## The Ecological Restoration Projects: planing, developing and evaluating

### PRELIMINARY TASKS

**Arrage for public participation in project planning and implementation to fulfill cultural goals.**

**Facilitate project implementation (Install roads and other infraestructure needed).**

**Environmental and technical monitoring : Engage and train personnel who will supervise and conduct project implementation tasks.**

## **The Ecological Restoration Projects: planing, developing and evaluating**

### **IMPLEMENTATION PLANNING**

**Describe the interventions tha will be implemented to attain each objective.**

**Acknowledge the role of passive restoration.**

**Prepare performance standards and monitoring protocols to measure the attainment of each objective.**

**Schedule the tasks need to fulfill each objective.**

**Obtain equipment, supplies, and biotic resources.**

**Prepare a budget for implementation tasks, maintenance events, and contingencies.**

## The Ecological Restoration Projects: planing, developing and evaluating

### **IMPLEMENTATION TASKS**

**Mark boundaries and work areas.**

**Install permanent monitoring fixtures.**

**Implement restoration tasks.**

## **The Ecological Restoration Projects: planing, developing and evaluating**

### **POST-IMPLEMENTATION TASKS**

**Protect the project site against vandals and herbivory.**

**Perform post-implementation maintenance.**

**Identify the project site regularly to identify needs for mid- course corrections.**

**Perform monitoring as required to document the attainment of performance standards.**

**Implement adaptive management procedures as needed.**

## The Ecological Restoration Projects: planing, developing and evaluating

### EVALUATION & PUBLICITY

**Assess monitoring data to determine whether performance standards are met and project objectives are attained.**

**Conduct an ecological evaluation of the newly completed project.**

**Determine whether cultural porject goals were met.**

**Publicize and prepare written accounts of the completed restoration project.**

Thanks for your attention