The Montreal's Nature Museums: dedicated to the protection of biodiversity

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Montreal Botanical Garden

Curitiba, March 26-28 2007

Four institutions…

Integrated in the Montréal landscape through the years

1931 — Botanical garden

1966 — Planétarium :

1990 — Insectarium :

1992 — Biodôme :

Representing the most important scientific institution complex dedicated to natural sciences in Canada.

Montreal Botanical Garden

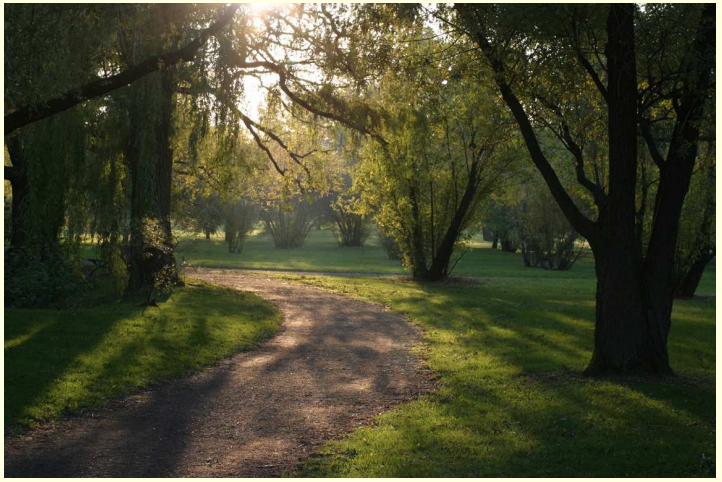
JARDIN BOTANIQUE DE MONTRÉAL

UNMUSÉUMNATUREMONTRÉAL

One of the most important in the world …

BOTANICAL GARDEN

75 hectares
22 000 plant species and cultivars
1,4 ha of greenhouse, 10 exhibition greenhouses open to visitors
30 thematic gardens (Chinese, Japanese, ..)
Arboretum including 13 000 specimens of some 800 species
1 million visitors per year



INSECTARIUM
DE MONTRÉAL

UNMUSÉUMNATUREMONTRÉAL

Insectarium

Most popular institution for children

INSECTARIUM

Living collection: 100 arthropods species

Naturalized collections: 160 000 specimens

important butterfly collection

240 000 visitors/year

BIODÔME DE MONTRÉAL

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Biodôme

Unique concept in the world ..

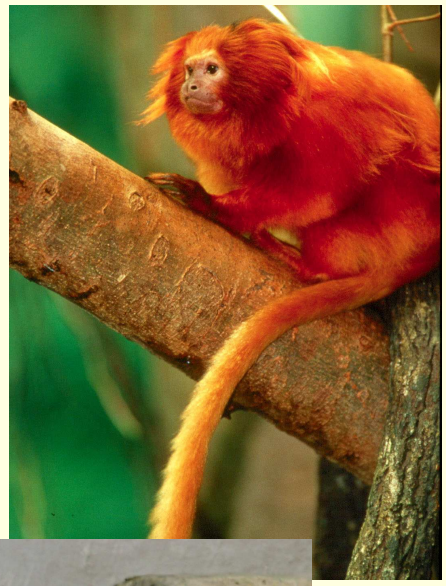
Biodôme collections

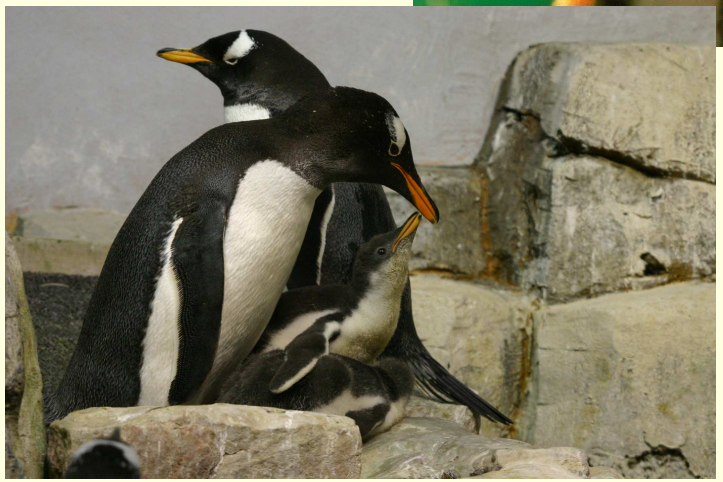
240 animal species– 4 700 specimens,
750 plant species

4 natural ecosystems of America :

Tropical rain forest;
Laurentian forest;
Marine ecosystem (St-Lawrence river);
Polar (Arctic and Antarctic).

800 000 visitors/year





Planétarium

PLANÉTARIUM DE MONTRÉAL

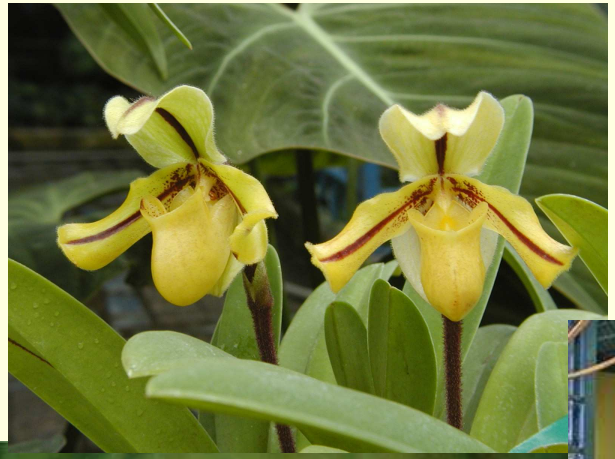
UNMUSÉUMNATUREMONTRÉAL

… The mission

The mission of the Montréal's Nature Museums is to increase public knowledge of nature and related disciplines, to contribute to the study and preservation of biodiversity and to promote responsible environmental behaviour.

Each institution contributes to the achievement of this mission in its respective sphere :
Botanical garden : botany & horticulture
Planetarium : astronomy
Insectarium : entomology
Biodôme : ecology

« *CONSERVATION* »



« *EDUCATION* »

« *RESEARCH* »

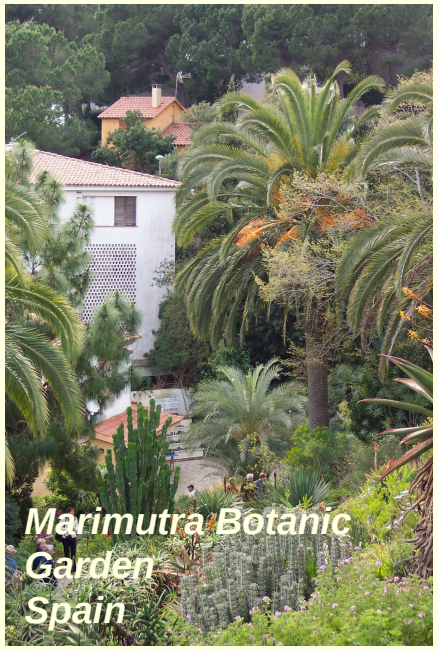
Botanical gardens, general considerations

- Botanical gardens play a key role in plant conservation. More than 6 million samples of up to 100,000 species are grown in over 2,300 botanic gardens around thre world.
- These plant collections include one-third of the world's threatened species.


Kew Botanic Garden
UK

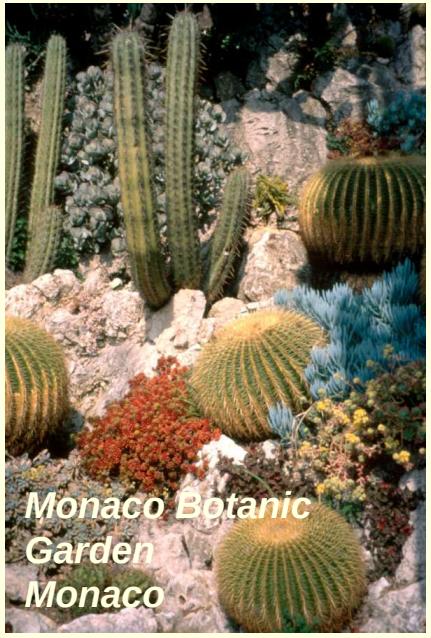
Lankester Botanic Garden
Costa- Rica


Missouri Botanical
Garden
USA


Marimutra Botanic
Garden
Spain

Botanical Gardens and biodiversity

- Botanical gardens are increasingly being called upon to participate in and promote the conservation and sustainable use of biological diversity – to protect and promote the world of plants for the benefit of people and the planet;
- Two years after the *Gran Canaria Declaration*, a ***Global Strategy for Plant Conservation (GSPC)*** was adopted unanimously at the sixth meeting of the COP to the Convention held in The Hague in April 2002 (Decision VI/9);
- The GSPC provide a framework for actions at global, regional and local levels.



Botanical Gardens and biodiversity

- **Botanic Gardens Conservation International (BGCI) (1989)**

  International Agenda for Botanic Gardens in Conservation

  The *Agenda* provide a global framework for botanic gardens policies, programmes and priorities in biodiversity conservation. It was launched in June 2000 at the 1st World Botanic Gardens Congress;

  The *Agenda* has been included as a major contribution to the achievement of the Global Strategy for Plant Conservation, a plan to rescue and conserve the world's plant, adopted by the CBD in 2002;

  In 2007, more than 400 botanical gardens signed the *Agenda.*

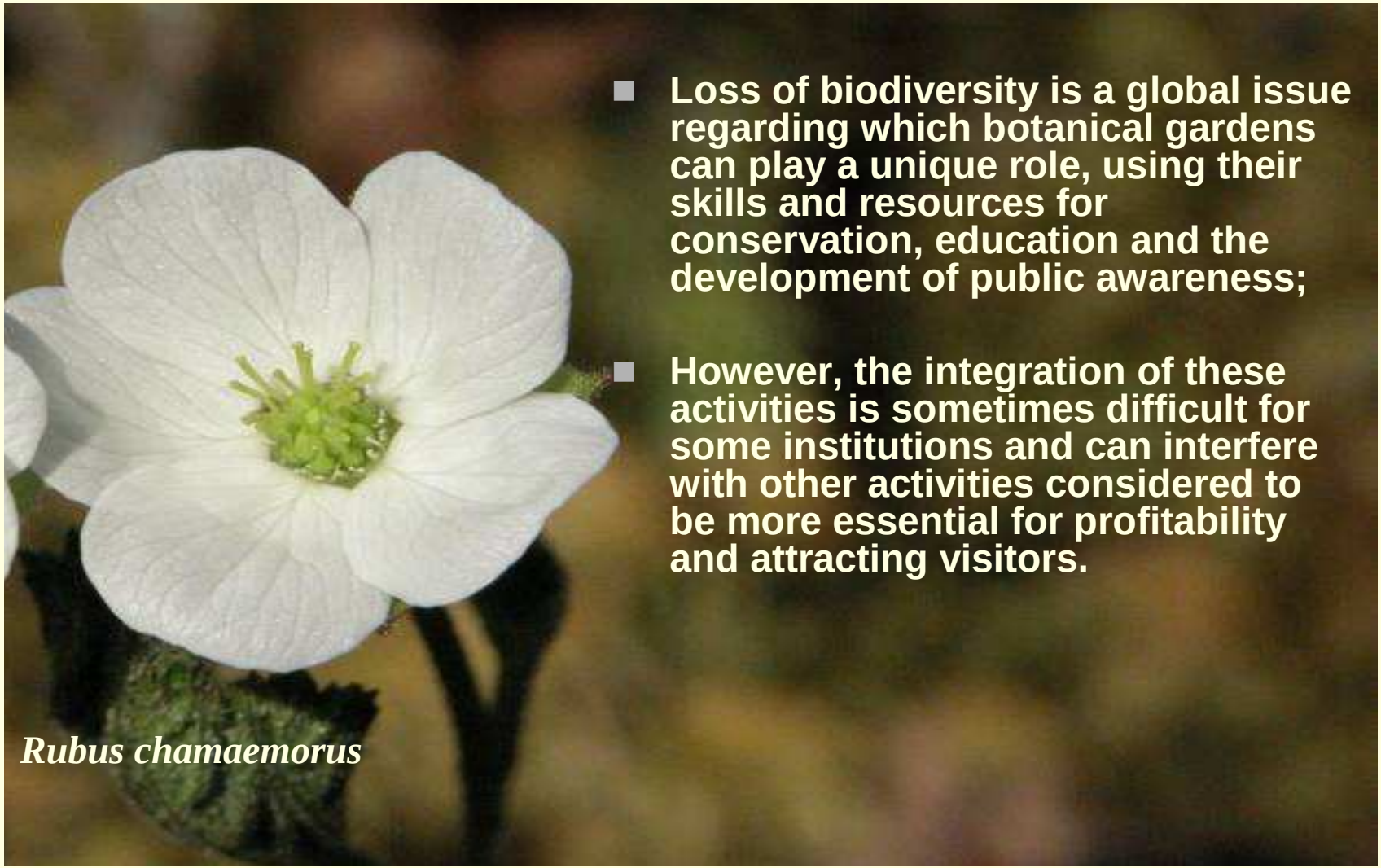
BGCI

Plants for the Planet

Development of botanical garden's collection

- Plants generally organized according to geographical or taxonomic criteria for display, research or educational purposes.
- Nevertheless, botanic garden living collections today represented a quarter to a third of the world's vascular plant species.
- The interest in loss of biodiversity is recent for many botanical gardens in the world;
- However, this could represent new challenges and roles for botanical gardens.

New challenges and roles for botanical gardens



- Loss of biodiversity is a global issue regarding which botanical gardens can play a unique role, using their skills and resources for conservation, education and the development of public awareness;
- However, the integration of these activities is sometimes difficult for some institutions and can interfere with other activities considered to be more essential for profitability and attracting visitors.

Some examples of activities related to conservation at the Montreal Botanical garden

- Urgence-Conservation (*ex-situ conservation project);*
- Ethnobotany research with Cree and Inuit communities in northern Quebec *(preservation of traditional botanical knowledge);*
- Phytoremediation research project *(domestic wastewater treatment, carbon absorption, etc.);*
- Plant inventories, ecological monitoring *(forest dynamics, bio-control, etc.)*
- Invasive species research *(Alnus rugosa);*
- Partner on Canada Plantwatch programme *(climatic change on plant phenology)*

Challenges of ex situ conservation of endangered species at Montréal Botanical Garden

Asclepias tuberosa var. interior

Montreal Botanical Garden's choice

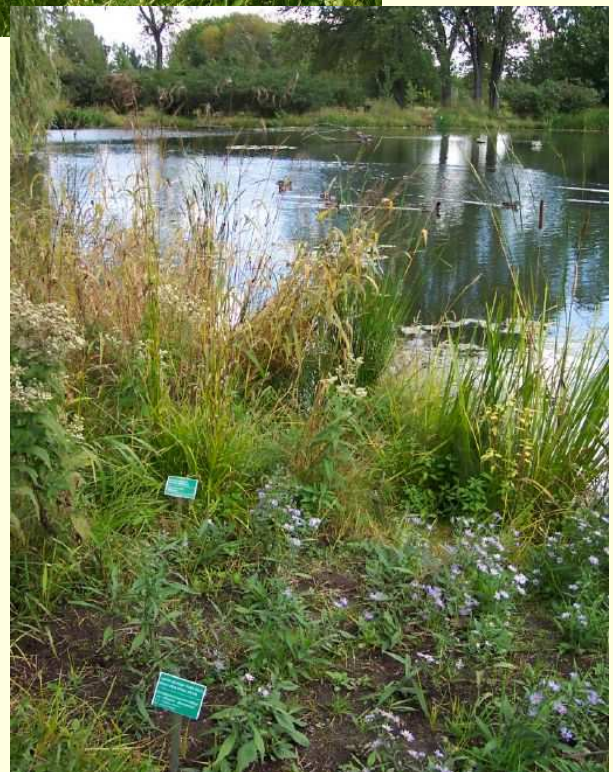
- Focus on regional flora, notably on Quebec endangered and vulnerable plants;
- Select plants that may have ornamental interest, more attractive;
- Propagate and introduce specimens among our gardens and collections;
- Develop educational activities and interpretation;
- Develop research activities (population, recovery, etc.).

Species at risk in Québec

375 species at risk
59 legally designated endangered
65% of them grow in the southern part of the province

Methods

- Collect of seeds in the wild in accordance to a very strict code of ethics;
- Culture and propagation of the plants in greenhouses and/or nurseries;
- Incorporated plants into suitable habitats in established display gardens.



Integrating horticulture

- Many species from a wide range of habitats
- Cultural challenges
- In some cases, establishment was successful, less so in others

Asclepias tuberosa var. interior

Example of successful establishment

Example of successful establishment

Example of successful establishment

Follow-up four years after establishement

Adiantum aleuticum		*Erigeron philadelphicus* subsp. *provencheri*	
Adiantum viridimontanum	†	*Eurybia divaricata*	
Adlumia fungosa		*Ga lium circaezans*	†
Allium canadensis		*Gaura biennis*	
Allium tricoccum		*Gentiana clausa*	†
Alnus serrulata	†	*Gentianopsis procera* subsp. *macounii* var. *victotinii*	†
Arabis laevigata		*Gentianopsis crinita*	†
Arisaema dracontium		*Hackelia virginiana*	†
Asclepias tuberosa var *interior*		*Helianthus divaricatus*	
Aspidotis densa		*Hieracium robinsii*	
Asplenium platyneuron		*Polygonum hydropiperoides* var. *hydropiperoides*	†
Asplenium rhizophyllum		*Polygonum punctatum* var. *parvum*	†
Bromus kalmii		*Pycnanthemum virginianum*	
Carex annectens var. *xanthocarpa*		*Quercus bicolor*	
Carex appalachica		*Ranunculus flabellaris*	
Carex hirsutella		*Sanicula canadensis* var. *canadensis*	†
Carex platyphylla		*Scirpus pendulus*	
Carex sparganioides	†	*Solidago ptarmicoides*	†
Carex swanii		*Solidago simplex* subsp. *randii* var *monticola*	
Ceanothus herbaceus	†	*Sorghastrum nutans*	
Cicuta maculata	†	*Staphylea trifolia*	
Claytonia virginica	†	*Symphyotrichum anticostensis*	
Cyperus lupulinus subsp. *macilentus*		*Symphyotrichum novi-belgii* var. *villicaule*	
Cypripedium reginae		*Symphyotrichum pilosum* var. *pinglei*	
Decodon verticillatus	†	*Toxicodendron vernix*	
Desmodium paniculatum		*Verbena simplex*	
Draba aurea		*Veronica anagallis-aquatica*	
Eleagnus commutata		*Viola rotondifolia*	†
Eragrostis hypnoides	†		

Integrating education

- Panels have been installed at various locations in the Garden:
  - **To explain the concept of the loss of biodiversity**
  - **To indicate the locations of these collections**

Integrating education (cont'd)

- Plants are identified with a special green label that makes them easy to recognise;
- Volunteers have been trained to guide visitors along the "path of biodiversity";
- New pages on our web site describe the project.

« Conservation Emergency Program »

- **Ex situ conservation project :**
  - **Potential conservation value is limited, but the next step is *in situ conservation project***
- **Cost effective**
- **On-going: not “funding dependent”**
- **Potential educational value: high**

The “Conservation Emergency Program” at Montreal Botanical Garden, in summary :

- Establish, within the existing collections, a “path to biodiversity of Quebec” which allows visitors to appreciate the wealth of local endangered plant species difficult to observe in the wild;
- Develop awareness of the principles of conservation, the sustainable use of natural resources and the protection of wild habitats;
- Implement a research program aiming at establishing the bases of conservation ex situ and in situ of the rare plants of Quebec.

Wild leek restoration program (Biodôme)

- Wild leek (*Allium canadense*) was the first plant species to be officially designated « endangered » in Québec (1995);
- Main causes : heavy harvesting, habitats destruction;
- Programme SEMAI'L was launched in 1999 (educational activities, articles published, website, etc);
- The seeding and rescue part program met the greatest enthousiam;
- More than 1100 owners of maple stand were interested in safeguarding the wild leek received seeds !

Wild leek restoration program (cont.)

- No more seeds distribution;
- But, major awareness and education effort continue :
  - Monitoring of the plantations and evaluation of the quality of the site
  - Web site updates on the biology and conservation of wild leek;
  - This project served now as a model for protecting others threatened species and their habitats in Québec.

Research in the Brazilian Amazon (Biodôme)

- Multidisciplinary team (University researchers from Brazil and Canada);
  - Front line prevention of human health problems in humid tropical climates (Tapajos River) through the development of sustainable land use methods for small-scale farmers (training, knowledge transfer, etc.)

Research in the Brazilian Amazon (cont.)

- Multidisciplinary team (University researchers from Brazil and Canada);
  - Intensifying the use of fallow forests among small farmers in the Rio Tapajos region of Brazil Amazon a lever for promoting sustainable land use in the region.

Willows: a wonderful « green tool » to remedy environmental problems un urban areas like Montréal !

- ***Salix vinimalis, a green tool for :***
  - **Biomass;**
    - *wood panel*,
    - *bioenergy, etc*.
  - **Erosion control**
  - **Phytoremediation;**
  - **Roadside noise-barriers**

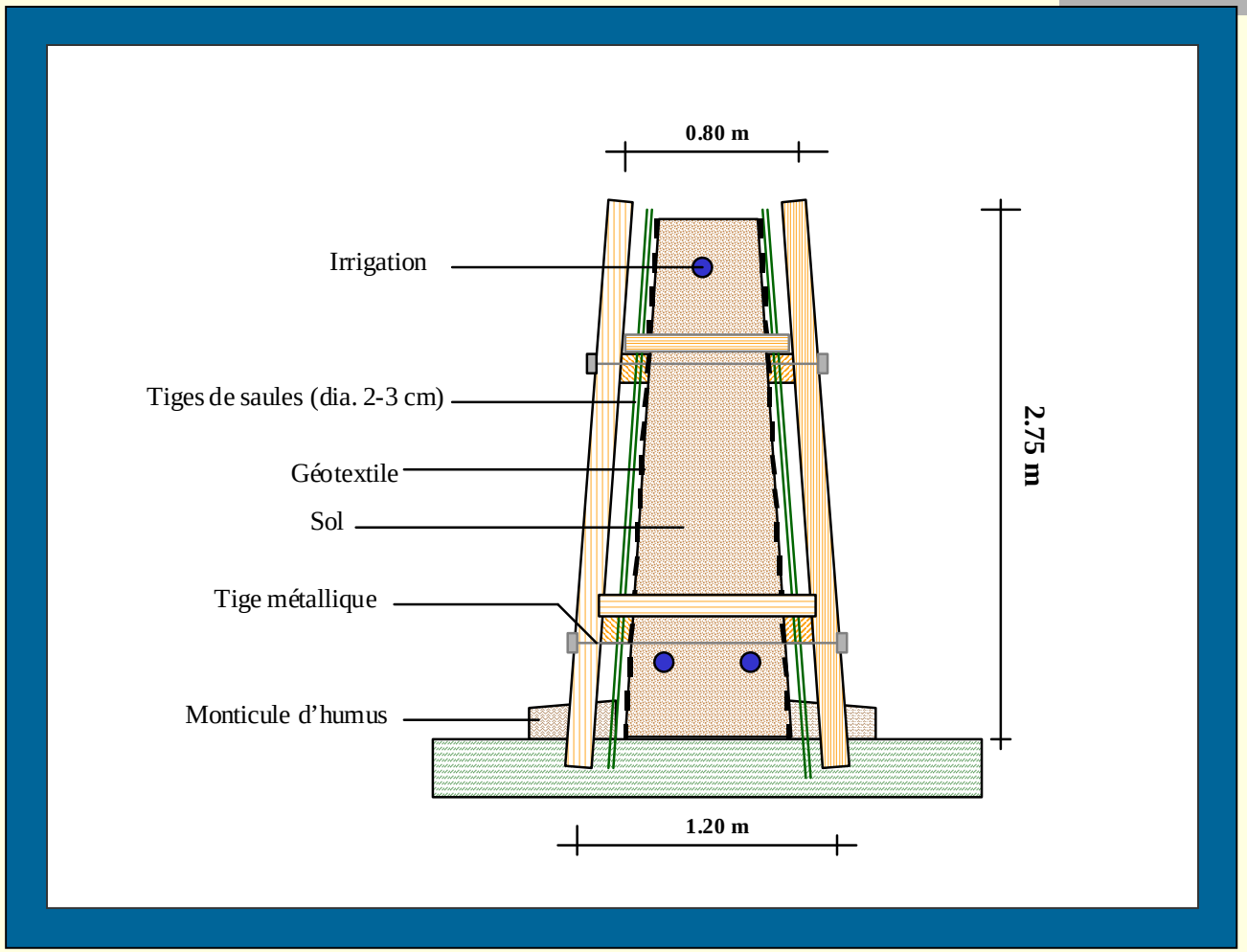
Erosion control

Phytoremediation

Roadside noise-barrier

Roadside noise-barrier

Construction technique



Roadside noise-barrier

Construction technique

Roadside noise-barrier

Construction technique

Roadside noise-barrier

Willow : green tool for cities

Willow : green tool for cities


I think an albatross is . . . .
Eleanor age 10 class 106
ONCE EXTINCT, YOU CAN ONLY IMAGINE.
100,000 albatrosses die needlessly each year because of longline fishing. These majestic birds pair for life and raise only one chick at a time. When one parent is caught and drowned on a fishing line, its partner may never mate again and the chick is almost certainly doomed.
Right now, the RSPB has people on fishing boats showing how simple changes to fishing methods can save this remarkable bird. We need more people on those boats before the albatross goes the way of the dodo – alive only in a vivid imagination.
To find out how you can help prevent the extinction of the albatross visit www.onceextinct.com
RSPB
No Smoking
CHARING CROSS

- **Thank you !**