

# Studying Biodiversity in our education programs: Strategies to better incorporate local examples

## Presentation of 7 Documents

2 procedures to follow to  
construct one item for the  
curriculum for 2nde

Other possible options niveau  
collège

Conception diaporama : A.Tourville, S. Lacas

Theme: Biodiversity, a result of years of evolution

**Pre requisites :**

Biodiversity is the variety of all living things; the different plants, animals and micro organisms, the genetic information they contain and the ecosystems they form. Biodiversity is usually explored at three levels - genetic diversity, species diversity and ecosystem diversity. These three levels work together to create the complexity of life on Earth.

**Main Concepts to develop:**

The following document can be used to indicate the changes regarding biodiversity and its continual changes, due to human activity.

**Two Steps in the instruction process**

- 1 step: two classes of one hour
- 2 step: One class of one hour



How to motivate the students ?

**FRANCE-ANTILLES**

www.franceantilles.fr — GUADELOUPE

Actualité Éducation / Santé / Environnement

## Le retour des « manman dlo »

CLAUDIA BELTON | France-Antilles Guadeloupe | 10.10.2009



### **Denis Girou, Director of the National Park:**

“ During the the preliminary months, we will begin by informing and discussing this mammals re integration into its aquatic environment with the fisherman. It is extremely important for the projects advancement that the population of the Bay du Grand Cul-de-Sac Marin, as well as politicians and socio professionals to fully be aware of this projects objectives. it is also important that neighboring islands are aware of this effort. it is in our intentions to build a center where personnel will be in charge of this mission. It is known that several schools have studied this topic, and it is evident that this animals resurgence in its natural habitat will be beneficial in respects to the environment.”

SEANCE 1/2:

DOCUMENT

### **Press Release:**

The director of the national park and the Director of SITA Esperance ( waste management center for Saint Rose), signed an accord which binds these two organizations together in effort to reintroduce the manatee to the regions waters. If everything goes as expected, in three years, the manatee, this extraordinary aquatic mammal , which is at risk of extinction will be reintroduced in the Bay of Gand-cul-Sac Marin.

## Optional Research Work:

Possible question for students:

Search in the document above arguments as to why this would be a beneficial project, as well as indicating certain elements that could be problematic.

## How to Organise the classe:

Group Work: → Who will represent some of the main people involved in this project

- **The National Park of Guadeloupe** (2 Docs presented)
- **The Nature Protection Association** ( 2 Docs Presented)
- The fisherman** (1 doc presented):

- the Boaters
- Sita Espérance
- The governmental institution *Région Guadeloupe*

→ **This will permit the students to fully comprehend the interests of each actor**

Ferdy Louisy, President of Guadeloupe's National Park:

**“ Man is responsible for the disappearance of the manatee, it is an important loss for Guadeloupe's biodiversity, it is only normal that we attempt to reverse this trend”**

## Historical Texts

- “ The ocean in the Culs de sac is very calm and not very deep, we could easily be aware of how other manatee, turtles and other fishes are doing in this area.”
- “ I am certain that in the first ten years, when the island was inhabited, an estimated of 3 to 4000 turtles, and a very large amount of manatee were killed, man continue to persecute these sea animals”
- Regarding the Manatee “ the meat of this animal is consumed by the inhabitants of this country. Every year boat loads of this meat is taken to the mainland as well as to neighboring islands”

Le Révérend Père Du Tertre- 1667

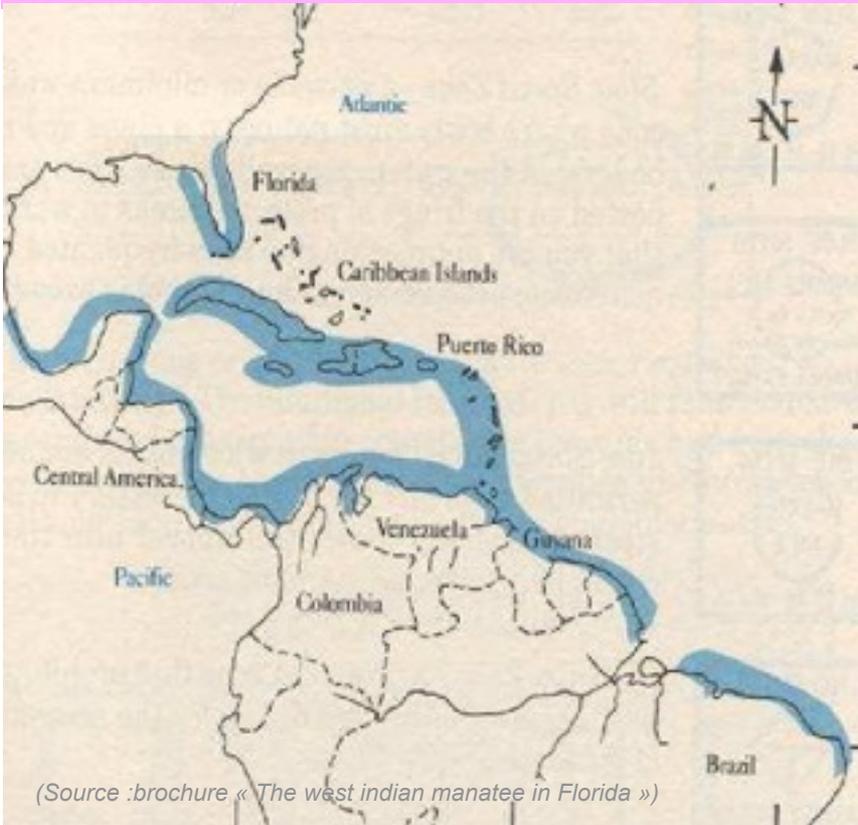
- “... a cow is no different then this animal, it's meat is the same color consistency, tender and delicate”

Le Père Labat- 1702

## The president of the National Park has stated:

“ It is imperative that we create ecological corridor, that stretches from florida to Colombia in the Caribbean zone”

### The historical area in which the Manatee have inhabited



(Source :brochure « The west indian manatee in Florida »)

\* An ecological corridor, this allows the migration and circulation of divers species and connects this animal to different geographical areas

### Area's where the Manatee still inhabits

Islands circled in blue indicate a presence, areas circled in red represents this seas animals absence.

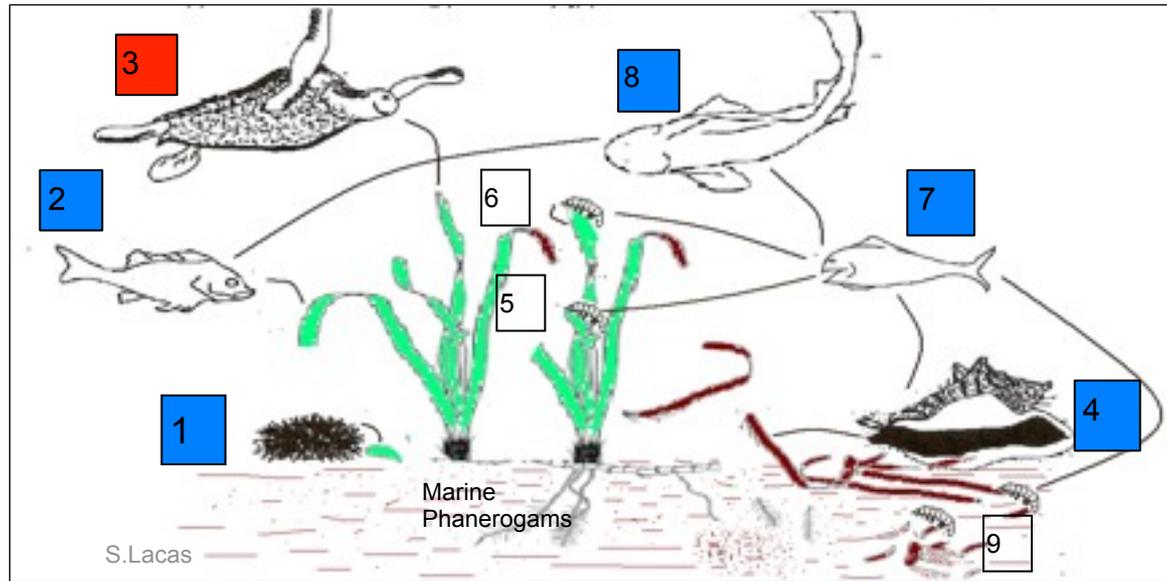


(Source:rapport Lartiges,Bouchon, 2002)

\* the disappearance of this sea creature is an unfavorable factor

## The use of Documents, Level Middle School:

Herbivorous organisms living in our ecosystem



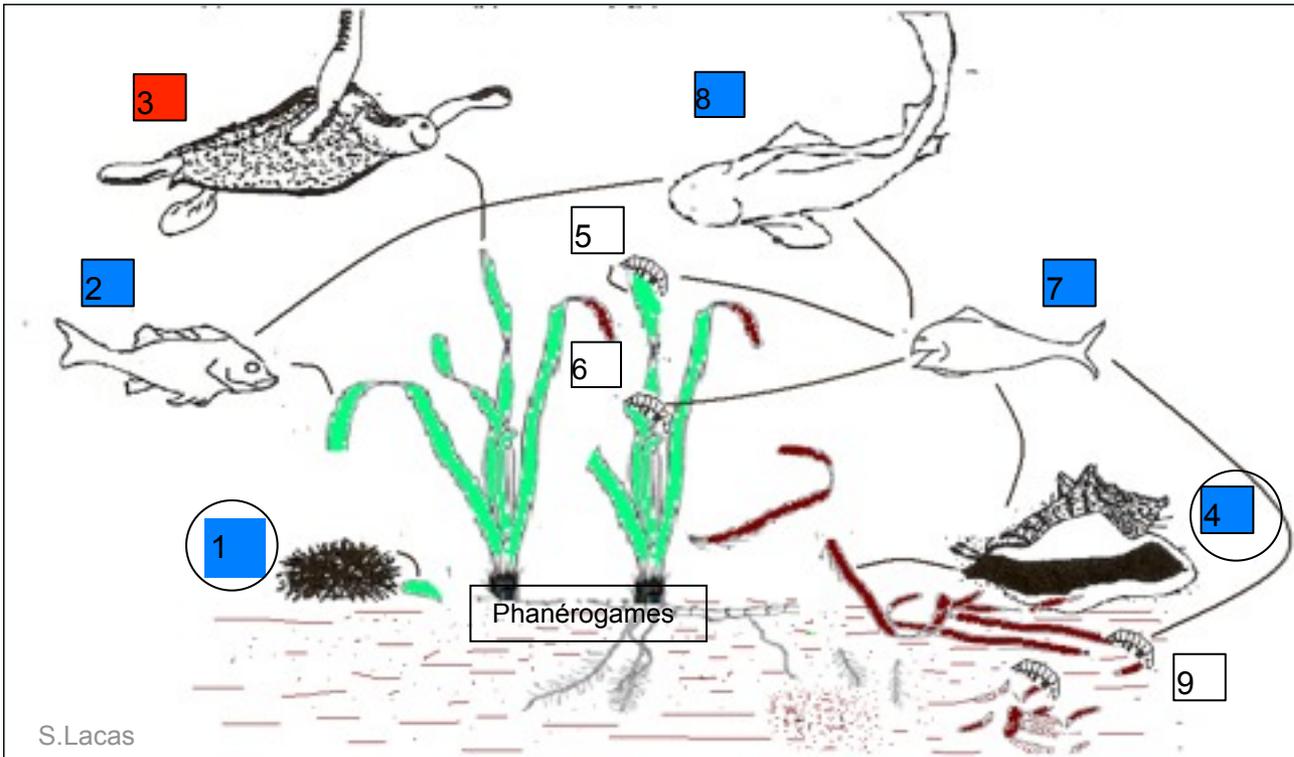
### Topics to explore

- Grade six: The Origin of living beings , bio diversity
- Grade Seven: The divers environments which species reside
- Grade Eight: Sexual reproduction and the species natural habitat
- Grade Nine: Human responsibility towards these species and the environment which they reside in.

This document that can be used at different levels. This can also be document given after a field trip

# The Nature Protection Association:

What's the future for other species in this aquatic environment?



The manatee eats up to 50kg of plant material everyday, and primarily lives off of seagrass

## Protected species:

- **Green turtle** : *Endangered species*
- **urchins and conch**: *species that are regulated in fishing*



**Species that are used for economique reasons:** Certain species become endangered or are threatened in their environment due to the fishing



**The Director of the Regional Committee of fisherman:** “ The fisherman, are living a true injustice, the eventual ban of fishing in the Grand Cul-de-Dac marin, with the return of the manatee”

**Press release from the Parc National:**

Approximately fifteen manatee should be reintroduced in the Grand Cul-de-Sac Marin .

• Certain environmental percussions have to be taken in order for their reintroduction into this area to go well.



### Fishing in Guadeloupe: A traditional practice (Données: comité régional des pêches)

- 1182 fisherman, 884 ships in 2005 (823 boats less than 9 metres long)
- local production estimated at 10 000 T /an, consumption 16 000 T/an (imported of operating deficit)
- A vital economic and social practice (3000 families are totally or partially dependant on fishing as an important revenue)

→ **Mutualisation** : role play, implementing divers actors / supportive arguments → Debates

<ul style="list-style-type: none"> <li>• <b><u>The National Park of Guadeloupe</u></b> <ul style="list-style-type: none"> <li>→ Help and protect the local ecosystem           <ul style="list-style-type: none"> <li>→ restore the local biodiversity</li> <li>→ create a ecological corridor in the Caribbean</li> </ul> </li> </ul> </li> <li>• <u>The region of Guadeloupe...</u></li> </ul>	<ul style="list-style-type: none"> <li>• <b><u>Fisherman</u></b> <ul style="list-style-type: none"> <li>→ Reducing the area where fishing is permitted</li> </ul> </li> <li>• <b><u>The Association for the protection of nature</u></b> <ul style="list-style-type: none"> <li>→ destruction of seagrass?</li> </ul> </li> <li>• <u>yachtsman...</u></li> </ul>
<p style="text-align: center;"><b>Arguments in favour for the reintroduction project of marine life</b></p>	<p style="text-align: center;"><b>Arguments against the reintroduction project of marine life</b></p>

→ **The debate will allow students to fully understand...**

- **To successfully conduct the reintroduction project, have to take into consideration the ecological, social, and economic issues that will arise**
- **The reintroduction of a specie is a complex issue that involves many different actors with divers interests.**

## session 2/2:

### **-Example of questions to provide:**

Using the knowledge which you have gained from the previous session, as well as the documents offered. Explain how bio diversity can change with time, make sure to identify the factors which can evolve over time..

### **-Session 1:**

The exploitation of a natural resource by man( the manatee) Can lead to the extinction or loss of biodiversity in an area

### **-Documents offered:**

#### **•1) An example of an invasive specie : The lionfish**

- A map that shows the this species invasive introduction and expansion in caribbean waters

-Characteristics of this species

#### **2)Coral reef and global warming**

## A new and invasive fish in Guadeloupe : The lionfish

Map of the different locations which the lionfish can be found in the caribbean.(the year indicates the first spotting).



August 1992 in southern Florida, six species of *Pterois volitans*, escape from an aquarium after Hurricane Andrew hits. This remarkable species was originally native to subtropical and tropical regions in the Indo-Pacific...

Données C.Bouchon, UAG

**A species that is considered to be "invasive" once it has spread to a new geographical area.**

## Documents on the lionfish

### *Reproduction*

- The reproduction period is throughout the year..
- The female lays her eggs every four days 2 large sacs of eggs which are covered in a mucus which are fertilized by the male. This matter is very light and then floats on the surface. The young invade the coral reef and other rock like marine matter, they can also be found in swamp like areas where they are able to familiarize themselves with the environment before exploring more rocky coral areas as adult fish
- Feeding patterns
- When young, lionfish consume generally plant like matter, as they mature they prey mainly on small fishes, invertebrates and mollusks in large amounts.
- In the tropical regions studies have shown that these lion fish consume over 50 different fish species. in fact all fish less than fifteen centimetre can be consumed.

### *The impact of the coral reef*

- A study in 2008 compared young fish on two large coral reefs, and the cohabitation the *Ptérois* with other young fish. The study showed that the young fish were reduced by 79 % on in areas where the *Ptérois* reside.

### *Predators*

The *Ptérois* are at the top of the food chain in the coral reef ecosystem and due to the lion fish's venomous tentacles it has very few predators.

(Source: Rapport C.Bouchon, UAG 2010)

## Coral Reefs and Global Warming

- The coral reef is one of the most bio diverse and exceptional ecosystems, harbouring over 500 species of fish live and harbouring in these areas, and 180 of these species are fished.

- Every year certain coral reefs whiten when the temperature increases, above  $29^{\circ}\text{C}$ . When the temperature decreases the coral reef recuperates.

- If the temperature is above  $29^{\circ}\text{C}$  for several weeks the coral reef dies.

- Algae grows on the dead coral, which during long term will be the lead to the total disappearance of the reef and the fish in that area.



**Whitening of the coral reef**



**Algae freely growing on the coral reef**

## Other Possibilities: 1 session

### **Introduction:**

We often hear the media talk about biodiversity and how it is changing.

### **Options:**

In the documents provided, find substantial evidence that the above statement is either true or false.

### **Documents:**

- Historical texts : The re introduction of the manatee
- An example of an invasive specie: the lion fish
- The coral reef and global warming

### **Conclusion:**

Students will learn in depth that biodiversity is ever changing, due to numerous factors, invasive species, climate change, and human activity.



## Ways to Motivate the students.

### Two procedures:

#### **The research and documents permit :**

- Students to discover species in their local environment
- Helps students to understand the reality and current events regarding the biology in their own region
- Allows students to work on important and complex subject matters

### Session two:

- Opening up questions about sustainable development
- Working in groups or individually
- Involving different actors
- Debates

## The expansion of a new fish in Guadeloupe: The lionfish



### **Characteristics of this fish:**

- Eating patterns
- Reproduction
- An invasive specie

**This topic could be explored for the following grade levels:**

- Grade 6: The Origin of living beings , bio diversity
- Grade 7: Sexual Reproduction and the divers environments which species reside
- Grade 8: Human responsibility towards these species and the environment which they reside in.



**These documents will be available on the SVT Academic website**

**The**  
**End**

**Thank you !**



Photo Kap Naturel