

# Seagrasses: Underwater Food Factories

**Purpose:** Students will learn about aquatic food webs using seagrass beds in Tampa Bay as an example.

## Objectives:

- The students will be able to describe the importance of seagrasses in Tampa Bay.
- The students will be able to construct a seagrass community food web.
- The students will be able to identify issues that affect seagrasses in Tampa Bay.

## Correlation to the Sunshine State Standards:

**SC.G.1.4.1** Student knows of the great diversity and interdependence of living things.

**SC.G.1.4.2** Student knows that changes in a component of an ecosystem will have unpredictable effects on the entire system, but that the components of the system tend to react in a way that will restore the ecosystem to its original condition.

## Correlation to Curriculum:

Pages 67-71 in the IS 1 curriculum.

Chapters 34, 35, and 36 Biology Honor's curriculum.

## Background Information:

Seagrasses are flowering plants that live in salt water. There are several kinds of these grasses found in the Bay including turtle grass, shoal grass and manatee grass. Seagrasses play an important role in the food chains of the Bay and also provide shelter to many organisms. Once the bottom of Tampa Bay was covered with seagrasses. However, turbidity created by dredging and pollution reduced the seagrasses by 40% from 1950 - 1980. There are several ideas put forth by the scientists in the video about specific causes of this destruction. The Tampa Bay Estuary Program was created to help restore the bay. Restoring seagrasses is a major goal of the Tampa Bay Estuary Program.

Major challenges remain for Bay restoration. These include reducing toxic materials and excess nutrients carried into the Bay via storm sewers. Residents play an important part in this process of bay restoration. A major portion of the nitrogen found in storm water runoff is from over-fertilized lawns. A growing threat to the bay is nitrogen from air pollution. Nitrogen oxides from power plants, cars, boats, and lawn mowers fall directly on the bay's surface or settle on land and eventually enter the bay through stormwater runoff.

## Activities:

### Activity 1

**Purpose** - To help students build on previous knowledge of food webs

**Materials** - Seagrass PowerPoint

**Duration** - 15 minutes

**Teacher Directions** - Use the PowerPoint presentation to build on previous knowledge of food webs, discuss causes of pollution in Tampa Bay and the effect on seagrass habitat.

### Activity 2

**Purpose** - Use the DVD to enhance the concept of the value of seagrasses and the threats to them.

**Materials** - Chapter 3 - "Seagrasses: Underwater Food Factories" DVD segment, "Video Quiz"

**Duration** - 10 minutes

**Teacher Directions** - Have the students watch the video segment and complete a five-question video quiz.

### Activity 3

**Purpose** - Reinforce the concepts viewed on the video

**Materials** - Student directions page and/or PowerPoint slide, half-sheets of colored paper or card stock for students' postcards, Info Sheet: "Life in a Tampa Bay Seagrass Bed," colored pencils and markers

**Duration** - 15 minutes

**Teacher Directions** - Have students create a postcard of a food web using Tampa Bay aquatic animals and Info Sheet: "Life in a Tampa Bay Seagrass Bed." This could be completed as a homework assignment.

## Assessment Component:

1. Video Quiz
2. Postcard and questions

## Relevant Vocabulary:

- **producer** - organism that can capture energy from sunlight or chemicals and use it to produce food from inorganic compounds; also called an autotroph.
- **consumer** - organism that relies on other organisms for its energy and food supply; also called a heterotroph.
- **decomposer** - organism that breaks down and obtains energy from dead organic matter.

- **herbivore** - organism that obtains energy by eating only plants.
- **carnivore** - organism that obtains energy by eating only animals.
- **omnivore** - organism that obtains energy by eating both plants and animals.
- **estuary** – a habitat having a mixture of fresh water and salt water.
- **detritus** – dead or decaying organic matter.
- **turbidity** - cloudiness of the water
- **seagrasses** – underwater flowering plants that live in clear, shallow water.
- **emergent** – extends above the water.

### **Additional Resources:**

*Biology* Textbook, Prentice Hall

Postcards or pictures of manatees, snook, etc. for students to reference while creating food webs

### **Tampa Bay Estuary Program**

<http://www.tbep.org>

**Florida Museum of Natural History** - fish and seagrass pages

<http://www.flmnh.ufl.edu/fish/southflorida/seagrass>

**Florida Fish and Wildlife Research Institute** - main seagrass page

[http://research.myfwc.com/features/category\\_main.asp?id=1323](http://research.myfwc.com/features/category_main.asp?id=1323)

**Student Directions: - Seagrass Postcard**

1. Create a color postcard describing (in pictures and/or words) a food chain or web using Tampa Bay aquatic life. Begin with sunlight and seagrass, and include

Bacteria/fungi	Reptiles
Algae	Birds
Invertebrates	Mammals
Fish	

2. Use the “Life in a Tampa Bay Seagrass Bed” information sheet
3. Label (or list) the producers, carnivores, omnivores, herbivores, decomposers on your postcard.
4. On the back of the postcard, answer the following questions:

1. Why did fishing in Tampa Bay became less productive after 1950?

Because poor water quality reduced the size of seagrass beds.

List three factors and explain how these factors caused poor water quality in Tampa Bay.

Potential Answers:

Population increased

More people lived near the Bay

More workplaces built near the Bay

More cars, trucks

More nitrogen entered the bay:

Sewage treatment plants were not like today (untreated sewage common in bay)

Industries dumped chemically polluted waste directly into water

No real government control of water pollution before 1972

2. What would you expect to happen if all the plants on your postcard died?

Explain your answer.

Potential Answer: Plants are the basis of food chains and webs.

Without plants, the animals could not receive energy from the sun. If there were no plants, the food web would be disrupted from the base up. Lower level animals would be affected first, followed by a ripple effect all the way up to high level carnivores.

## **Information Sheet - Life in a Tampa Bay Seagrass Bed**

**Directions:** Use these organisms listed below and the information about them to create a food web for a Tampa Bay Seagrass Bed.

Bacteria, Fungi - Generally microscopic, they decompose seagrass leaves.

Algae - Fuzzy-looking growth on seagrass leaves. When the leaves die, the leaf and the algae become detritus (dead or decaying organic matter).

### Invertebrates

Scallops: Spends most of their short lives hiding in seagrasses to escape being eaten by stone crabs and, of course, people. Once common in Tampa Bay, overfishing and poor water quality decimated scallop stocks in the mid-1960s. Scallops are filter feeders, and filter detritus and microscopic plankton from the water.

Stone crabs: These animals are bottom dwelling predators that eat plants and animals. They can feed on scallops and live or dead fish. Crabs act as decomposers, cleaning up dead or decaying animal material.

Shrimp: Shrimp grow up hiding in the seagrass. They feed on detritus. Snook eat shrimp.

### Fish

Snook: Snook once were harvested commercially, but now are caught just for fun. These sleek and powerful fish are silvery green in color with a sporty black racing stripe. They eat smaller fish, crabs and shrimp.

Bonnethead shark: This shark is an active predator. It hunts around shallow seagrass beds or mangrove islands in water 3 to 13 feet deep. It eats a lot of fish including mullet and snook

### Reptiles

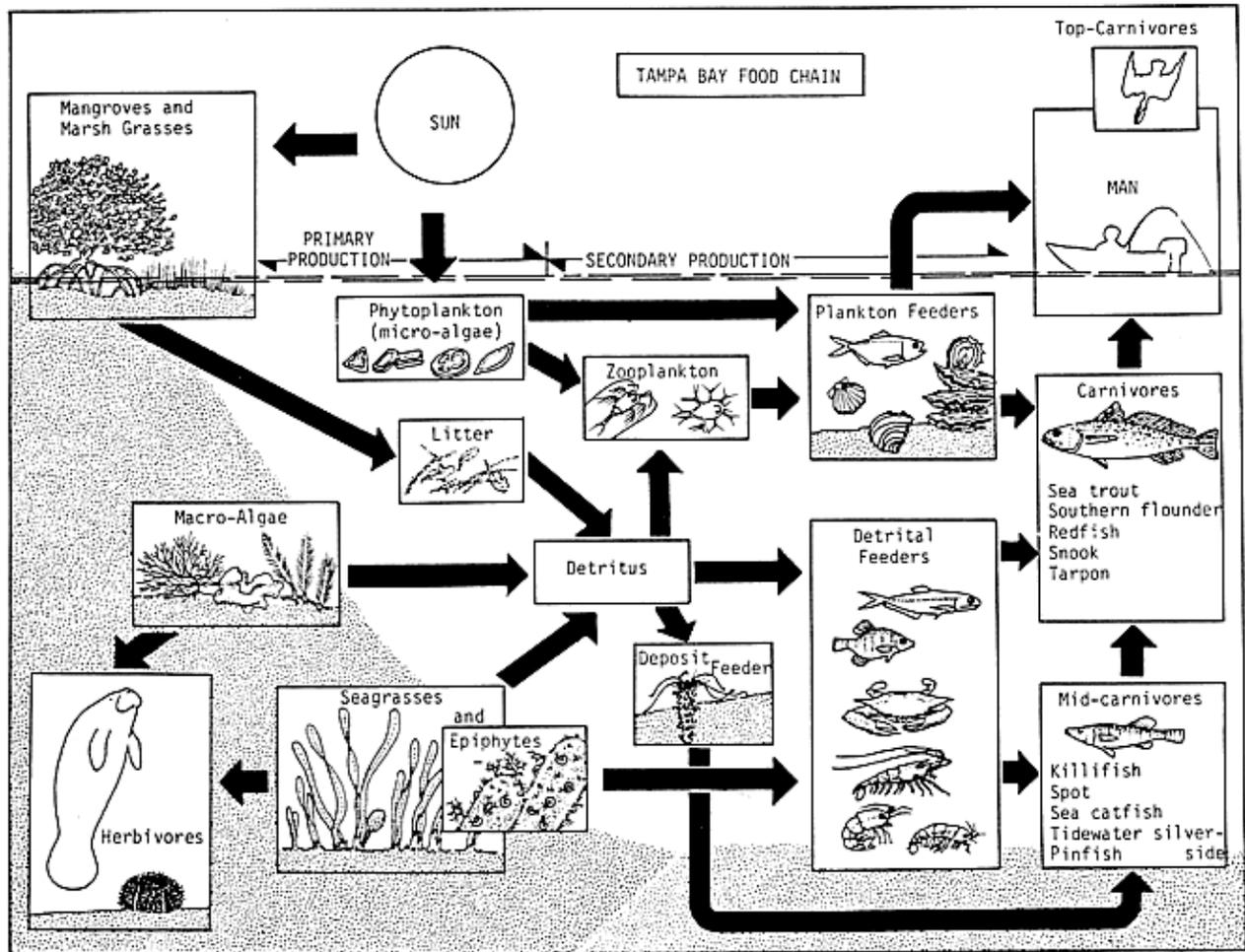
Sea turtle: The main food of the green sea turtle is a type of seagrass commonly called turtle grass.

### Birds

Wading birds: Birds with long legs and pointy beaks (like herons and egrets) wade through shallow waters over seagrass beds searching for food. These birds may eat shrimp or small fish like young snook.

### Mammals

Manatee: An adult manatee may weigh more than 1,200 pounds and consume 100 pounds of seagrass or other aquatic vegetation each day! It does not eat meat.



Source The Ecology of Tampa Bay: An Estuarine Profile- U.S. Department of the Interior