Cattails, a sustainable food source that can be used to reestablish habitats in bulkhead areas.

Nhu, Tyajah,Tyler, Connor, and Radames

What is a habitat?

The area or natural environment in which an organism or population normally lives. A habitat is made up of physical factors such as soil, moisture, range of temperature, and availability of light as well as biotic factors such as the availability of food and the presence of predators. A habitat is not necessarily a geographic area—for a parasitic organism it is the body of its host or even a cell within the host's body.

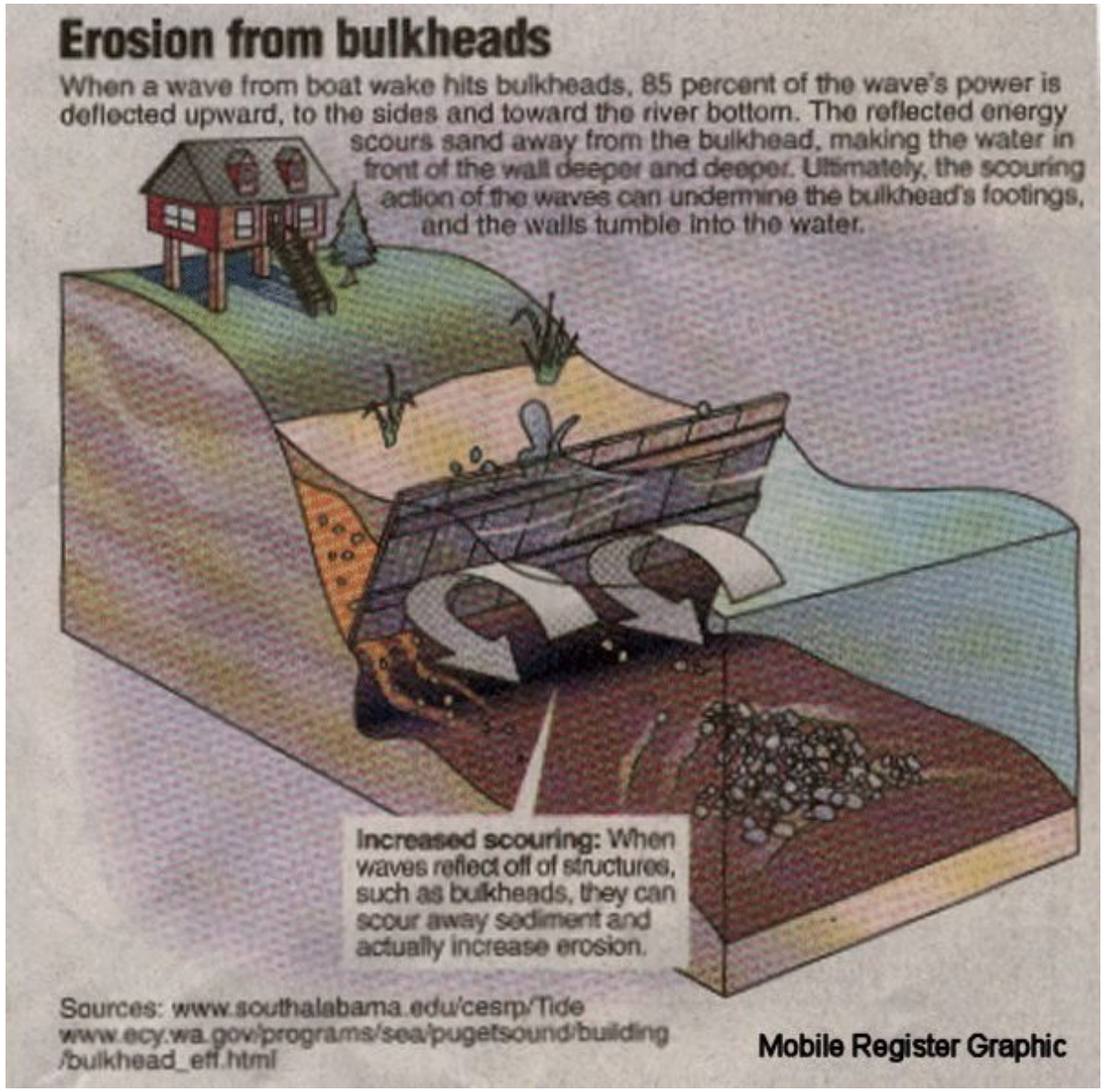
What are transitional areas?

According to the National Wetlands Research Center transitional areas are:

- “Wetlands are *ecotones*, or transitional areas, commonly located between open water bodies and uplands. This means that the boundaries surrounding a wetland are either predominantly aquatic or mostly dry. Because they are intermediate areas, ecotones often contain more plants and animals than the adjacent habitat found along their edges. Wetlands can be found in each State in the United States.
- In general, there are two broad categories of wetlands:
  (1) Coastal Wetlands
  (2) Inland Wetlands”

What is a Bulkhead?

- A retaining wall along a waterfront.



Natural habitat vs habitat with bulkhead

Lost because of bulkhead instillations

- Trees
- Predators
- Natural grasses
- Berries
- Shrubs
- Leaves
- Pinecones
- Nuts
- Animals
- Deer
- Rabbit

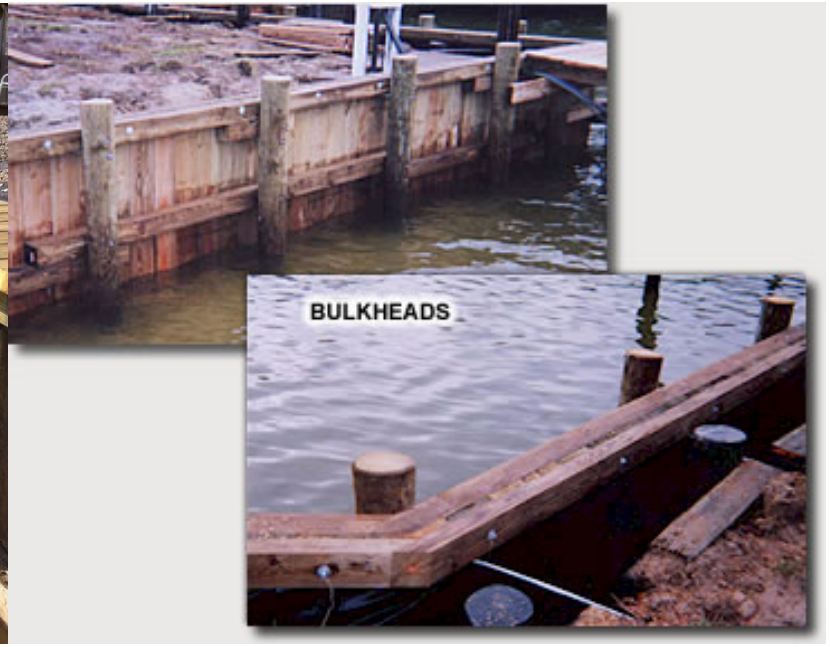
Gained from bulkheads

- Houses
- Boat
- Bulkhead
- Signs
- People
- Algae
- Pollution
- Oil
- Fertilizer
- Dramatic change from water to land.

The habitat changes before and after

1. Water
    a. quality it decrease because of the pollution
    b. algae growth from fertilization
2. Water to land
    a. bulkhead added which destroy gradual change from water to land
    b. animal and plant are pushed out of the transitional area
3. Land may increase or decrease
    a. landscape change to more open land space
    b. less species diversity
4. Air
    a. air pollution from boats and cars
    b. gas pollution from boats and cars
    c. air quality is better in the natural habitat than the bulkhead habitat because of the number of trees producing oxygen.

The problem is that we are loosing our natural resources from bulkhead developments.

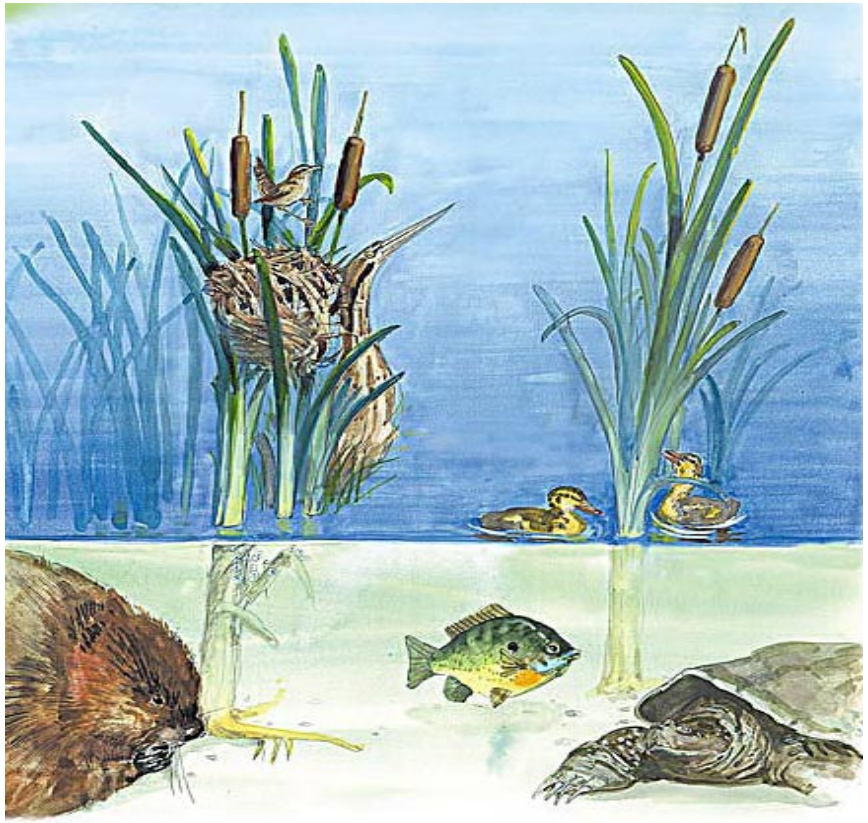


What plants can we grow at bulkheads to improve the habitat?

Solutions to bulkhead problems by brainstorming ideas to solve the problem of loss of habitat:

1. Growing bamboo at bulkheads
2. Flowers in containers at bulkheads
3. Cattails
4. Ivy
5. Lilly pads
6. Sunflowers

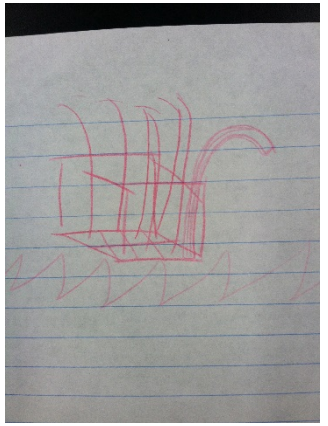
Cattails solution

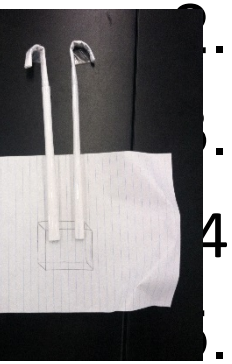


- Cattails are a solution because they provide shelter for the native species such as frogs and small fish in the transitional zone between the deeper water and the upland.

- Cattails are an excellent food source, which are commonly used in the Asian population. They can be used in soup, vegetables, greens, root-bakes, and can replace the use of flour (even for pancakes).
- **Caution: Some plants that resemble cattails and are poisonous**.

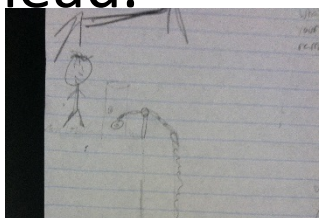
How can we construct a habitat within containers for cattail plants to provide a sustainable food source at bulkheads?





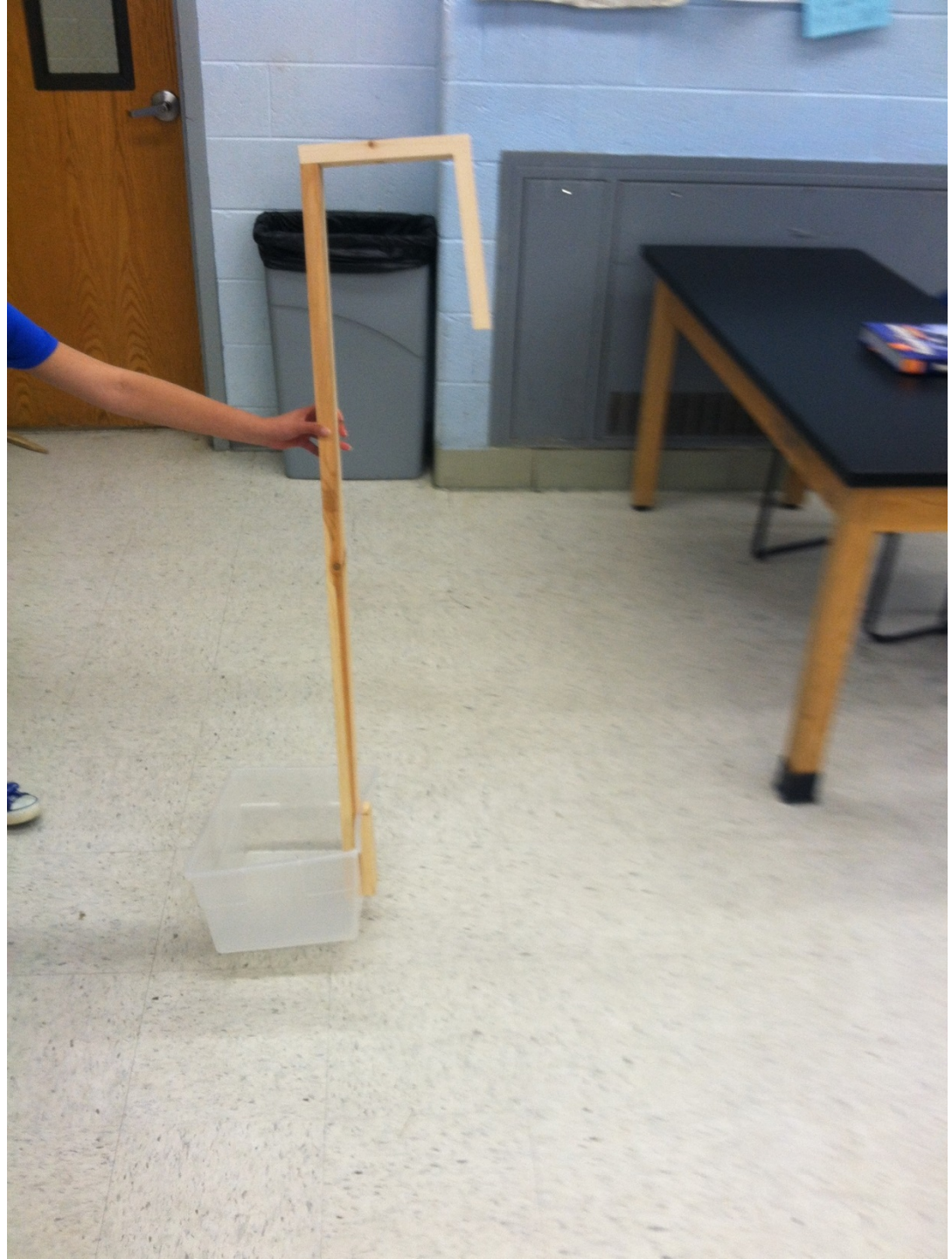
Design ideas:

1. Box with holes
2. Round basket with holes
3. One that looked like crab trap
4. Box with holes in the bottom with hook on the side.
5. Float a circular container with plants in it and attached to the bulkhead.
6. Box with floaters and chain with come-a-long wrench to pull it up.



Prototype designed for test area at the Oakcrest pond's over flow area.

1. 125 cm tall of 1x3 wood
2. 25.5 cm wide, down 28 cm hook of 1x3 wood
3. 40cm x 28cm x 16.5 cm plastic box



How are we going to test the cattails?

1. Place five cattail seeds with placement toward the center of the container. Therefore, seeds will not travel out of the holes that allow water to the plants.
2. Two cattail group plants

   a. one group of about 25 cm tall with placement toward right center of the container.

   b. other group about 40 cm tall with placement toward left center of the container.

3. Install container with about 3 to 4 cm of mud soil.
4. Fill the container with about water about 4.5 cm

What is not addressed by our cattail solution?

- The solution does not use cattails to provide shelter for the native species such as frogs and small fish.
- Does not address the erosion caused by bulkheads.

How can we provide shelter for the native species such as frogs and small fish by redesigning or adding to the cattail habitat container?

Habitat container for cattail plants should be placed between 4-16cm below the water, so the native frogs and fishes would be capable of reaching, swimming between and hiding in the cattails.

Installations

1. We place soil where the cattail seeds were placed on top.
2. Install 2 cattails plants with soil around them that were about 93 cm tall.
3. We put the cattail habitat container on the left side of the overflow that resembles a bulkhead.

Observations after 4 days:

- the cattails seemed to be moved by someone
- the plants looked to be dying
- The hook system worked good until we pulled it back up, then it became loose.

Response

- Move placement of plants into the pond.
- We are now testing to see if the light helps
- the plants.

What would be a good sign that the transplant cattails are doing well?

What would be a bad sign that the transplant cattails are not doing well?

What do we need to take?

Observations after 8 total days:

- Algae Growth in the test container.
- Cattails appeared to be lighter green and spots of brown.

New direction by group agreement

- Plants should half the size as the original
- Two identical cattail habitat containers to compare results
- Placement:

  a. one will be placed where there is more growth of cattails

  b. other will be placed by the first container.

New direction not agreement by group

- Debating the number of holes and hole placements. (high on the side, low on the side, on the bottom, or keeping the holes in original spots)

New design and hole placement by the students that working on building the new cattail habitat containers.

- Reinforced corner-

- Hole placement -

Observations after 21 total days:

The two original cattails died.

Three new cattails have grown up since the last observation ranging in height from 11 to 19 cm.

The cattails many have grown up from the seeds or from the older root system.

Two new identical models placed in opposite sides of the pond with two transplanted cattails in each.

After 28 days

- The original container that was moved into the pond had:
  - A bird resting in the container.
  - Six shoots going up from the mud next to the dead transplanted cattails may have grown from seeds or from the root system. (Ranged in height from 9cm to 60cm.)
  - Tiny spiders along the edges of the container.
  - Water wart.
- The two identical models that were located on opposite sides of the pond had:
  - No new growth, possibly because no seeds where placed.
  - Had one dominant cattail remaining.
  - Some dead cattails.

Conclusion about the first cattail test

- Cattails grow in the mud cattail habitat container.
- The Cattails must have direct sun, so if built for bulkhead areas placement must be in area of direct sun away from the side.

Work cited

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