

# Wetland Demonstration

## Model Wetland in a pan – Paper Mache Method

(adapted from: FLOW Unit 2: WATER | MICHU 08-402 | © Michigan Sea Grant, Regents of the University of Michigan | [www.projectflow.us](http://www.projectflow.us))

**Activity:** Students observe a simple wetland model that demonstrates wetland functions including filtering and flood buffering.

### Objectives

After participating in this activity, students will be able to:

- Observe/participate in building a model wetland
- Relate importance of wetland function to people's needs and daily lives
- Demonstrate wetland functions using the model

### Summary

Wetlands provide some of the most important ecological functions of any habitat type. They support an abundance of wildlife, help control flooding, filter nutrients and sediments and even some harmful pollutants, and can also provide nursery areas for fish. In the process, wetlands improve water quality and enhance our natural environment. By creating a wetland model, students observe these concepts in action and see what happens when wetlands are present and when wetlands are not present.

### Background

Wetlands are an important feature of the Great Lake region. Since the time of European colonization, the continental United States has lost half of its original 221 million acres of wetlands. Estimates of losses of wetlands in New York State since colonial times range from 50% to 60%. (Dahl 1990; EPA 2001b) Although wetlands losses have slowed dramatically since the 1970s, approximately 290,000 acres of wetlands are lost nationally per year. (Dahl 2000) The loss of wetlands can have a drastic effect. The impacts to New Orleans and other communities along the Gulf Coast from Hurricane Katrina were due in large part to development decisions – and attendant regulatory decisions – that reduced wetlands and the natural protections from storm surge that they provide. (Travis 2005). (Website for the Source: <http://www.nyc.gov/html/om/pdf/2009/pr050-09.pdf>)

Some major functions of wetlands include:

- Reduce flooding (flood buffering)
- Filter pollution
- Prevent soil erosion
- Provide habitat for aquatic and terrestrial animals and plants

## Materials and Preparation for the Model:

- Flour
- Water
- Newspaper
- Acrylic Paint
- Sealer (water resistant) (I used decoupage sealer and finisher).
- Rolling paint pans (pans that have an angle work better than flat ones)
- Sponges, Carpet, or florist oasis foam
- Cup of soil (I used food grade diatomaceous earth)
- Jar of muddy water
- Items to represent pollutants other than soil – such as confetti or glitter



## Procedure:

### Build a Model Wetland

Make a wetland model to demonstrate how wetlands filter sediment and pollutants. This model involves using paper mâché. The students can help create the model as it will take a few days to prepare.

Tear newspaper into strips approximately 1 to 2 inches wide

Mix flour with water (warm water is recommended)

Dip newspaper strips in flour/water mix



Lay strips on the paint trays to cover, then put a second layer of strips in opposite direction of first layer

Let the paper strips dry

Repeat layering of newspaper

Let paper strips dry



Paint the dried paper mâché a base color (white) to prime

Paint over the base layer to represent human activities (homes, roads, farms, etc). Make sure to paint a stream at the deep end of the pan.

Seal the painted pan with water resistant decoupage sealer.

In one of the pans fit the piece of carpeting, sponge, or florist foam into the area between the simulated stream



and the rest of the pan. (I used two sponges placed end to end so that the edges would go up the side of the pan to simulate how an actual wetland would absorb the water. Otherwise the water will flow around the sponge wetland).



The jar of muddy water represents erosion from the streambanks. Ask the students what other kind of pollutants might be found in an area - if it's a farm there will be manure (use the cup of dirt to represent this aspect), if it's a landscaped yard there will be herbicides, pesticides, if there is a road there will be road salt, carbon emissions from cars and tires, trash

that people throw out their car windows, dog and cat elimination products, etc. Have the students toss pieces of confetti or glitter or something to represent the different pollutants onto the display as they name them (again, please use the dirt to represent manure).

Ask: What do you think will happen to the when it rains?

(The rain should pick up and carry some sediment and other pollutants over the land and into the body of water.)

1. Pour the muddy water into each pan. Explain that this water represents polluted runoff such as silt from farmlands and construction sites or salt from snow-covered streets.
2. Pour the water from each tray into separate jars – or observe it in the two pans - one portion of water should be muddy but the other should be less muddy since it was filtered by the simulated wetland
3. Ask the students to compare the two jars of water. Explain that the wetland trapped the soil particles, making the water in the body of water much clearer. The uphill side of the wetland should be coated with trapped sediment. Without a wetland, excessive amounts of silt and pollutants can end up in lakes, rivers, and other bodies of water.)

## Discuss the Results

- How might muddy water affect fish?
  - Makes it harder for them to see and breathe with clogged gills, and could lead to their death.
- How might the muddy water affect other animals and plants?
  - Settling sediment smothers clams and mussels, plants do not get sunlight needed for growth, birds and other animals that eat fish or plants have less to eat if food sources die or cannot be seen in muddy water, etc.
- How might the muddy water affect boats and ships?
  - The mud settles out and eventually fills channels important for navigation.
- How might all of this affect you?
  - Decrease in natural resources and food sources;
  - decline in quality of drinking water;
  - impacts on recreation such as swimming and fishing; change in aesthetics; change in community economy, such as shipping problems that affect jobs and industry, etc.
- How can we prevent these undesirable effects?
  - By protecting wetlands and helping to make their benefits known.
- Have students describe how wetlands function to reduce flooding and retain sediments.
- Have students analyze what would happen to water, sediments, homes and wildlife if wetlands were destroyed.

## Adaptations

Students, individually or as small groups, can make their own detailed wetland models using small aluminum foil pans, clay, and florist's foam, carpet, or sponges. Provide reference books with pictures of different types of wetlands. Students can use an assortment of collected material to decorate their models. Have students present their models by explaining their particular characteristics. Some ideas:

1. Use long pine needles for reeds and toothpicks to attach plants.
2. Shape wetland creatures from clay, or glue paper cutouts to toothpicks.
3. Dried flower heads make nice trees, and small pinecones painted green form evergreens.
4. For cattails, use cotton swabs. Paint sticks green and cotton parts brown, or paint toothpicks green, and attach bits of brown clay to the tops.

### **Helpful web links:**

[http://water.epa.gov/type/wetlands/outreach/education\\_index.cfm](http://water.epa.gov/type/wetlands/outreach/education_index.cfm)  
<http://www.greenwing.org/dueducator/ducanadapdf/teachersguide.pdf>  
[http://wetlandslive.pwnet.org/resource/wetland\\_ecology.php](http://wetlandslive.pwnet.org/resource/wetland_ecology.php)  
<http://youtu.be/frJFJMfPMd4>