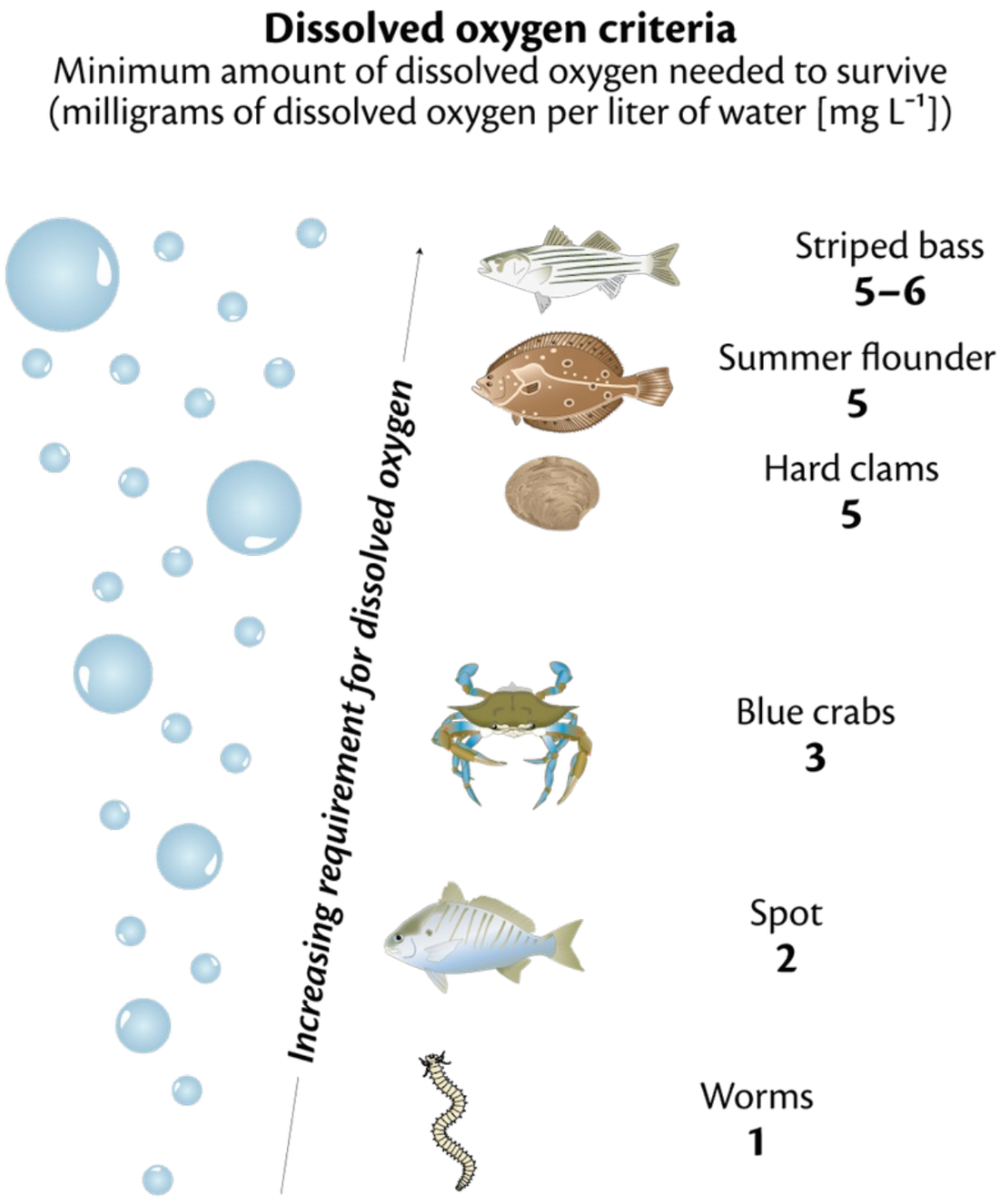
South Bethany Canal Water Quality Committee

DELAWARE CENTER FOR THE INLAND BAYS

# Floating Wetlands: Explained!

You've probably been hearing a lot of buzz about floating wetlands lately. That's because South Bethany is working with the Center for Inlands Bays on a project to clean up their canals and we're using "green" methods to do it!




Different organisms require different levels of dissolved oxygen in the water to survive. Dissolved oxygen is a useful indicator of water quality. Diagram courtesy of the Integration and Application Network (ian.umces.edu), University of Maryland Center for Environmental Science. Source: Dennison, W.C., J.E. Thomas, C.J. Cain, T.J.B. Carruthers, M.R. Hall, R.V. Jesian, C.E. Wazniak, and D.E. Wilson. 2009. *Shifting Sands: Environmental and cultural change in Maryland's Coastal Bays*. IAN Press, University of Maryland Center for Enviromental Science.

## Why do the canals even need help?

Healthy waterways can boast clear water with healthy levels of dissolved oxygen that support fish, invertebrates, and other marine creatures. Unfortunately, this is not the case in South Bethany.

Because there is so much excess nitrogen and phosphorus (collectively known as nutrients) in the canal waters, algae feeds and quickly overwhelms the delicate

ecosystem. Then, that same algae which feeds on the nutrients, also “feeds” on the dissolved oxygen in the water.

If you want to be technical, the algae actually produce oxygen in daylight, BUT they consume oxygen at night. And as algae dies, bacterial decomposition uses up even MORE oxygen in the water, resulting in extremely low or wildly fluctuating DO concentrations. Without enough steady O2, fish, shellfish and other aquatic species are killed off and begin to disappear from the area.

## Where is this nutrient pollution coming from?

Generally in the Inland Bays watershed, nutrient pollution comes from sources such as:

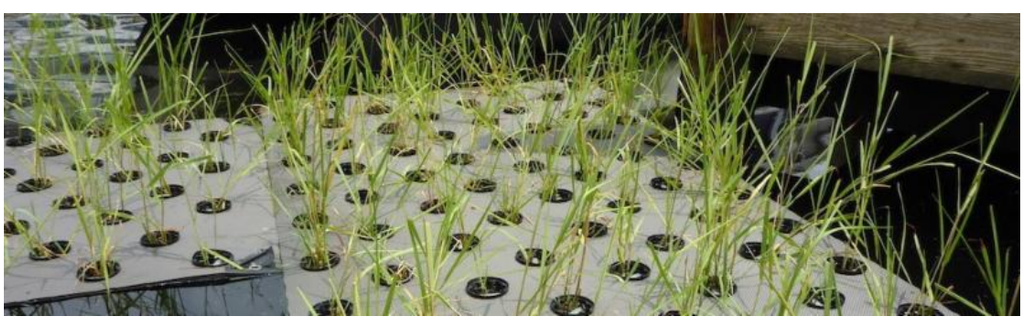
- Fertilizer and manure runoff from lawns and agricultural fields
- Wild animal and pet waste runoff
- Septic systems (both failing and maintained can leach nutrients)
- Discharge from sewage treatment plants (no longer in the Inland Bays as of 2018!)
- Stormwater runoff
- Car and power plant emissions

South Bethany, though, has an additional issue to contend with: much of the town was developed prior to the passing of Delaware’s stormwater regulations in 1990. When correctly implemented, these regulations help reduce nutrient pollution from runoff sources — the first two sources from our list above. But since these regulations were not used to design South Bethany specifically, excess nutrients, sediment and bacteria from the area regularly winds up in the residential canal systems.

Adding insult to injury, the layout of the canals simply does not allow for the twice-daily tides to flush the polluted waters out into the larger Little Assawoman Bay.

## How floating wetlands help!

South Bethany has been working with the Center for several years on stormwater retrofit projects, including planted median bioswales that capture runoff from the road and filter the water as it seeps into the ground! The floating wetlands are a sister project to these stormwater retrofits that focuses on the water already in the canals.



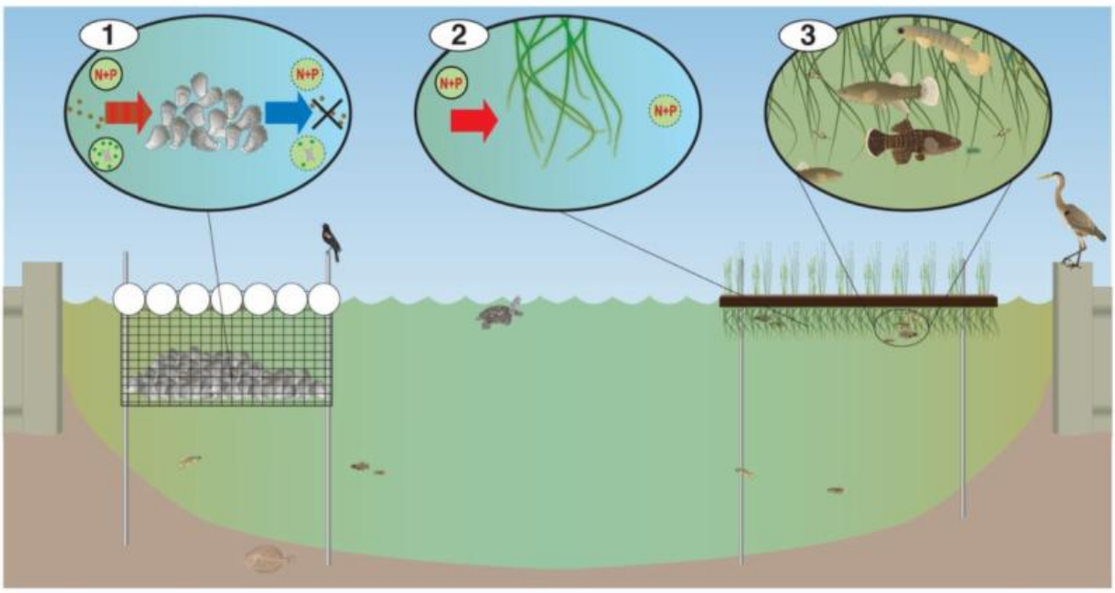
As the name suggests, a floating wetland is a planted, man-made wetland that floats in canals attached to the bulkheads. The plants used, Spartina alterniflora, have their roots dangling in the water where they feed off of the excess nutrients, taking up and binding nitrogen and phosphorus in the plant tissues. The root systems also help the ecosystem by hosting a variety of macroinvertebrates that form the base of a healthy food web. The root systems also act like filters that trap suspended sediment that would otherwise cloud the water. Meanwhile, the plants above the water create a lovely habitat / resting spot for

herons, migratory songbirds, monarchs, and other beneficial critters!

**Over time, we hope to see reduced levels of nutrient pollution, clearer waters, fewer algal blooms, and improved concentrations of dissolved oxygen in the canals.**

*This project was partially funded by a Community Water Quality Improvement Grant from the Water Infrastructure Advisory Council, the project will be administered by the Department of Natural Resources and Environmental Control's Nonpoint Source Pollution Program.*

**Floating oyster cages and wetlands can positively affect water quality in dead-end canals.**




**1**

**High concentrations of nitrogen and phosphorous** (N+P) in dead-end canals can cause algal blooms (of **phytoplankton**) which, when combined with **suspended sediments**, can lead to poor water clarity and poor water quality.

In an oyster float, each oyster can filter up to 50 gallons of water daily, leading to **lower concentrations of nitrogen and phosphorous** (N+P), **suspended sediments**, **and phytoplankton (micro algae)**. This leads to improved water clarity and water quality.

**2**

In a floating wetland, plants like ***Spartina alterniflora*** , and ***Eleocharis spp.*** have roots that extend into the water. These roots are naturally covered in a thin layer known as biofilm: a slimy film made up of microorganisms including bacteria, fungi, and algae.

This biofilm can help the plant grow and protect it from pathogens, but it can also take up **nitrogen and phosphorous** (N+P) from the water, leading to **lower concentrations of nitrogen and phosphorous** (N+P) and improved water quality.

3

In a floating wetland, plants like ***Spartina alterniflora***  , and ***Eleocharis spp.***  create excellent habitat for native fishes like **mummichogs**  , and striped killifish  .This habitat provides a safe hiding spot for protection, as well as food in the form of micro-organisms like algae  and small critters like shrimp. 

As the ecosystem grows healthier, it will also play host to birds,  turtles  and other creatures who come to the canal in search of a convenient meal.

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