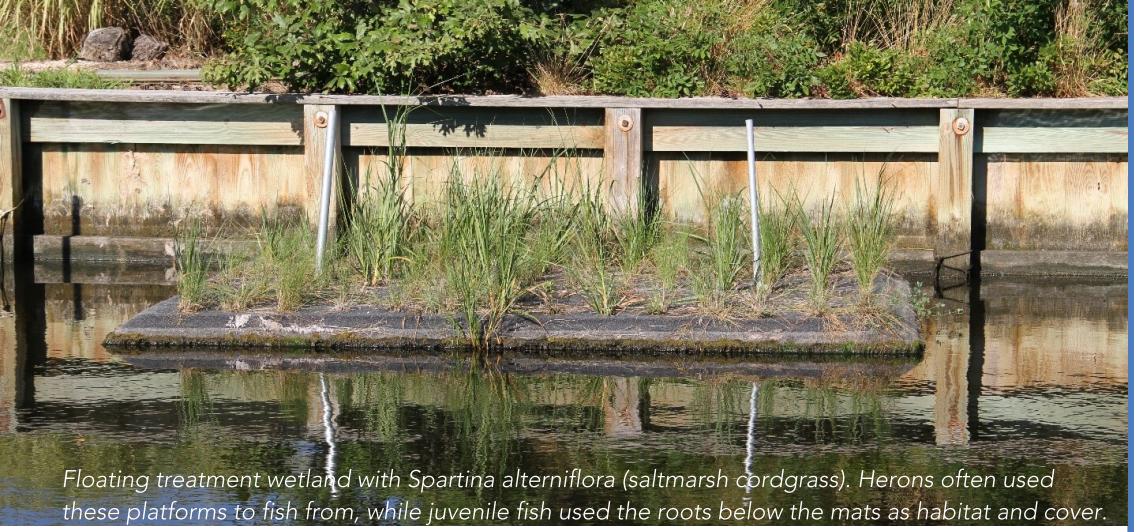


Floating treatment wetland with Spartina alterniflora (saltmarsh cordgrass). Herons often used these platforms to fish from, while juvenile fish used the roots below the mats as habitat and cover.

Alternative Treatments for the Bio-Enhancement of Dead End Canals

Project Status:
Completed November 2017

Project Summary

Background

The Town of South Bethany's dead end canals are characterized by very poor water quality. Slow flushing rates and elevated nutrient levels frequently lead to excessive growth of algae. These algal blooms create extreme fluctuations in dissolved oxygen (DO) concentrations that harm fish and invertebrates. Excess algae and sediments also cloud the water so that bay grasses are deprived of light and cannot grow. Traditional approaches to water quality improvements, such as stormwater retrofits, are costly and often difficult to implement in urban settings. This project investigated a complementary approach to water quality improvement within the canals themselves.

Project Description

Islands of eight floating treatment wetlands, along with 198 bushels of adult oysters placed in floating cages, were deployed in the York Canal located in South Bethany, DE. To determine the success of this approach, water quality was monitored at the project site and compared with a control canal for two years while the treatments were present, and then for another year following their removal.

Objective

The project goal was to demonstrate the feasibility of using treatment wetlands and floating oyster cages to improve water quality in poorly flushed canals. Oysters filter algae and remove excess nutrients from the water. Floating wetland plants also take up nutrients. Their roots hang into the water, further hosting microbes that help to reduce nitrogen (through a series of chemical reactions) and creating a complex habitat for fish and other aquatic life. We hypothesized that DO concentrations and water clarity would increase in the treatment canal, compared to the control, particularly during summer morning hours when DO usually is lowest.

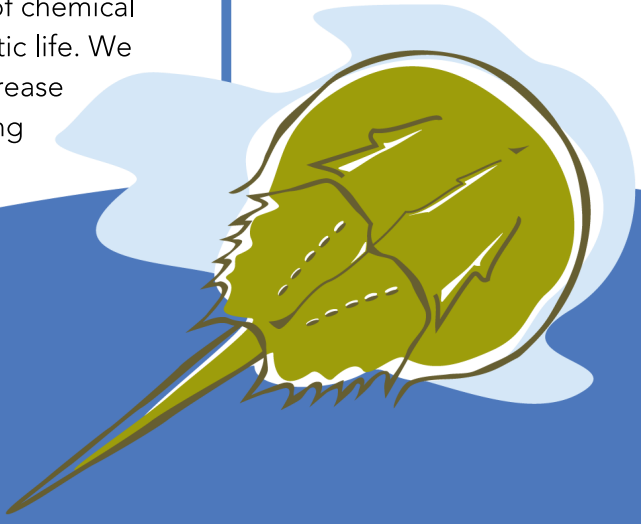
Project Contact:
Andrew McGowan
Environmental Scientist
environment@inlandbays.org

Partner:
Town of South Bethany

Funding:
DNREC Nonpoint Source Program, Community Water Quality Improvement Grant; Town of South Bethany; EPA Section 320 Grants

Contractor:
Cardno (design & installation); Stroud Water Research Center (monitoring assistance)

Project Timeline:
Oysters and wetlands were installed spring 2015. They were removed in 2017, and monitoring continued for another year.



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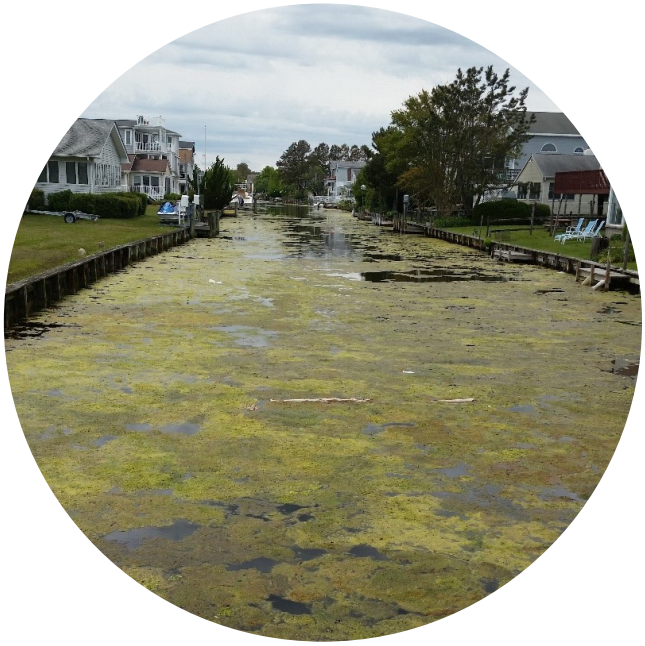


Outcomes/Conclusions

While water clarity improved slightly, and algal biomass was lower in the treatment canal when oysters and wetlands were present, the changes were small and did not result in meaningful water quality improvements. No increase in dissolved oxygen was observed. Increasing the numbers of oysters and wetlands could result in the desired water quality goals, but the act of scaling up would make this experimental method highly labor intensive and infeasible for most small towns or communities. The floating wetlands did create a habitat that was used extensively by fish and invertebrates.

Image (left): Excess floating algae in a dead end canal in South Bethany. Excess algae like this can create dangerously low concentrations of dissolved oxygen in the early morning hours.

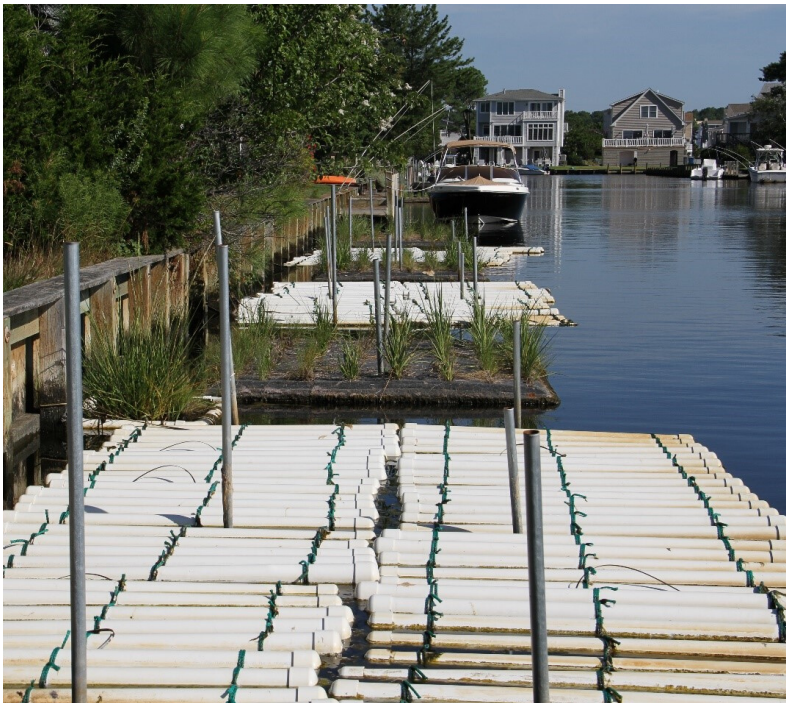
What You Can Do

Residents can help reduce excessive nitrogen and phosphorus inputs into canals by reducing fertilizer use, maintaining vegetated buffers near the water, using pervious materials for driveways, and disconnecting downspouts that discharge to the canals.

CCMP Focus Area

This project fulfills objectives outlined in the Comprehensive Conservation Management Plan (CCMP) for the Delaware Inland Bays.

- Focus Area: Water Quality Management
- Objective: Reduce nutrient input to residential canals and lagoons



Floating treatment wetlands and several arrays of floating oyster cages along a bulkhead in South Bethany.

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The Delaware Center for the Inland Bays is a non-profit organization established in 1994 to promote the wise use and enhancement of the Inland Bays and its watershed. With its many partners, the Center conducts public outreach and education, develops and implements restoration projects, encourages scientific inquiry and sponsors research. To learn how you can get on board with the bays, please visit www.inlandbays.org and follow us on Facebook @deinlandbays!