



**OVERVIEW of the SOUTH BETHANY OYSTER WATER QUALITY IMPROVEMENT PROGRAM**  
***Using Shellfish (Oysters) Cages, Oyster Gardening and Artificial Wetlands***  
***to Boost Canal Water Quality***

The current South Bethany Oyster Program has three primary components: 1) Submerging oyster cages along specific town-owned canal ends within our canals; 2) Promoting individual property owners hosting floating oyster gardens adjacent to their docks; and 3) Promoting individual property owners hosting floating wetlands adjacent to their docks. The implementation of this 3-pronged objective is to reach our primary goal of cleaning up our five mile network of canals.

**OBJECTIVE: Introduce as many oysters and artificial wetlands into the canal system over time as the Town can afford, owners will accept, and resources will permit.**

Motivated by the fact that a mature oyster can filter as much as 50 gallons of water a day. Our canals are in dire need of clean water. In concert with the Center for Inland Bay (CIB), the town's Water Quality Committee is focused on this objective. In March 2017, in partnership with South Bethany, the CIB repositioned the oysters and artificial wetlands from the York Canal pilot program to the South Anchorage Canal.

The CIB is an invaluable and necessary partner in using natural, biological means to improve water quality. They are highly motivated to work with our Town to improve our canal water quality and demonstrate the effectiveness of oyster beds in improving water quality.

Taking the oysters/wetlands route to cleaner water is an ongoing effort that requires:

- 1) the support of Town Council and the Water Quality Committee is critical to producing results;
- 2) the approval of State Agencies and partnerships with the CIB;
- 3) the volunteerism and support of property owners; and
- 4) funding and possibly manpower.

**1) Oyster Cage Program**

Some marine biologists believe that drastically reduced populations of oysters and other shellfish account for much of the excessive algae growth here and in neighboring inland waters. If shellfish were at historic levels, they could be consuming much of the algae now being fertilized by phosphates and nitrates. It has been calculated that shellfish once filtered the Chesapeake Bay (average volume) every day and a half.

If South Bethany moves ahead with building oyster populations over time, how many oyster will we need?

It has been calculated that about 1.4 million healthy, mature oysters could turn a volume of water equal to our canal system clear in a day. However, oysters can't flourish everywhere. Among other things, they require a minimum level of dissolved oxygen to survive. There are times when portions of our canals don't have the minimum. However, some of our oyster gardeners have shown that oysters can be sustained below the minimum if they are cleaned regularly to improve water circulation. The average life expectancy of an oyster is 20 years. Twelve years is CIB's Andrew McGowan's educated guess. Thus on-going replenishment is part of the plan.

Rutgers University has already developed an immune oyster. South Bethany uses immune oysters in our oyster gardens. Any new oysters introduced into our waters will be immune.

The presence of shellfish can sometimes improve oxygen levels in water that has a lot of algae. This means the introduction of shellfish can potentially improve the survivability of shellfish in less favorable waters nearby.

*Here is how this works:* Algae convert CO<sub>2</sub> into oxygen during the day, but some of the oxygen is consumed by the algae after the sun goes down.

Massive amounts of algae can limit how much sunlight gets below the surface. This slows the production of oxygen during the day and can even reverse the process to oxygen consumption, as if it were night. Excessive algae can also mean decaying plant matter, another reducer of dissolved oxygen.

When shellfish reduce the amount of algae it becomes easier for the remaining algae to boost oxygen levels. It is estimated that algae account for 50% of the world's photosynthesis.

There is another benefit from algae removal. Bottom dwelling sea grasses oxygenate the water and also shelter marine life. They don't grow here anymore, primarily because inadequate light. Algae filtering shellfish would improve this situation over time. This is another reason the Town requests the "algae harvester services" from the Department of Natural Resources in the spring when the algae build-up is great.

The State prohibit us from just loading our canals with oysters. There will be at least three governmental hurdles to overcome and require the CIB's assistance to introduce new oysters:

- The process of relocating the oysters from York Canal to South Anchorage Canal required the sign off of several State agencies. Andrew McGowan of the CIB has handled everything. In the future, we will need Andrew or someone like him to work with the agencies in order to secure the oysters.
- It is not legal to take shellfish from our waters for consumption. The State has concerns that oysters could be stolen from our "unsafe" waters and sold on the public market. This concern of the State cannot be taken lightly. A massive oyster program for New Jersey's Barnegat Bay was shut down over similar concerns.
- The State is cautious about having non-native species introduced into its waters. This a rational concern, but it means we can't get oysters from anywhere. Again, the CIB will be the guide in locating the best oysters.

## **2) The Oyster Gardening Program – Seeks Property Owner Volunteerism**

The current Oyster Gardening Program represents a way to bring in more oysters into our canal waters without getting additional State approvals. The program already has all the approvals it needs. Many owners have been asking for gardens. We should be able to respond to their requests. Bob Collins, who leads the program for the CIB, expects to have 45 new floats within 2017. South Bethany has requested all of them but we are assured 20.

The benefits of an expanded oyster gardening program has a new process. Previously, oysters have been raised to maturity and transplanted to other areas. However, the CIB has found that it is better to transplant small, quarter-size oysters. They will now be taking oysters away and replenishing baskets more frequently than before. The expanded oyster gardening program will start resulting in cleaner water after about a year. We may be able to keep some of these oysters to help build our own populations. In the long term, the oyster gardening program could result in our having many more mature oysters filtering away.

All our oysters in the current gardening program and those that were on the York Canal pilot program were on surface floats. The York Canal floats were large and unsightly enough to limit owners' acceptance of an expanded program. The individual oyster gardens are much smaller and will remain in floats to facilitate monitoring.

The York Canal oysters which were moved to the South Anchorage Canal have had their containers sunk and stacked below the surface. Oysters in any future programs will be sunk similarly. The poles holding the containers under the water will protrude into the canal surface but will be marked for boater safety. This approach will appeal to homeowners.

## **3) Artificial Floating Wetlands – Seeks Property Owner Volunteerism**

Homeowner demand for them far exceeds the supply. Canal end homeowners were very receptive to hosting the York Canal floating gardens. We may be seeking more floating wetlands for interested volunteer hosts.

The York canal wetlands measure 8'x10', which is fair amount of space. However, the CIB has responded favorably to our request to make them smaller - 4'x10' - to locate between docks.

An artificial wetland is a surface float with local marsh plants inserted, including a flowering plant species. The wetlands can be suspended several feet above the canal bottom. The CIB has found that their roots will extend down to the bottom.

The wetlands present no regulatory hurdles as long as native species are used. They will help oxygenate our dead water areas. They will give small crabs and fish a place to hide. They will require little maintenance and will reportedly last a very long time.

### **GENERAL STRATEGIES:**

- 1) Fund as much of this effort as possible through private sources and other means that won't impact the Town budget (possibly grants).
- 2) Show positive test results and, better yet, visible results as quickly as possible. This will require that our oyster introductions be concentrated to avoid having their impact dissipated.

- 3) Owners will be most supportive of a program they see working. Develop a focused, long-term communications process to promote homeowner support and to communicate about the program's progress.
- 4) To the extent owner cooperation permits, introduce oysters into our canals from Jefferson Creek outward toward the canal ends. Begin introducing the wetlands at the canal ends and move toward Jefferson Creek. In other words direct the oysters from the good water toward the bad and the wetlands from bad to good.
- 5) Work to maintain the CIB partnership in achieving South Bethany's objectives. Also, become their go-to place for new approaches and pilot programs.

**For Additional Information**

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