

BIG-BOX RETAIL CENTER
RETENTION POND RESTORATION
AUGUSTA, GEORGIA



2019 CASE STUDY



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MOSQUITO INFESTATION LEADS TO SHORELINE RESTORATION, ENVIRONMENTAL REPAIRS

Augusta, Georgia



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PROBLEM:

MOSQUITO INFESTATION DUE TO A DAMAGED RETENTION POND OUTFLOW CULVERT SYSTEM CAUSING STAGNANT WATER.

SOLUTION:

RESTORING THE OUTFLOW CULVERT SYSTEM, RESTORING COLLAPSED SHORELINES & REDUCING EXCESS SEDIMENT.

Swarms of mosquitoes near a retention pond adjacent to a big-box retail center was the first indication that the area was suffering from significant environmental damage. What started out as a possible extermination project resulted in a major environmental initiative involving shoreline restoration and a wide range of related repairs.



Big-box out flow culvert pipe is damaged from years of high capacity storm water run off.

When complaints of mosquito infestation surfaced in Augusta, Georgia last year, the owners of the retail center and city officials began the process of investigating the situation. There was some urgency since the retention pond was adjacent to a school.

After closer analysis, it became clear that this mosquito breeding ground was the result of the following dynamics on the property:

1. Collapsed shorelines along the retention pond resulting from years of torrential rainfall
2. Compromised and damaged outflow culvert due to constant water pressure and collapsed shorelines
3. Accumulated sediment at the mouth of the culvert resulted in stagnant water, preventing water flow into the pond and causing invasive vegetation growth and algae.
4. The pond's water level was raised due to sediment accumulation resulting in reduced pond depth
5. Increased size of the pond's surface area and water volume due to collapsed shorelines

"These issues contributed to the mosquito infestation," said Ryan G. Leeds, Managing Partner of SOX Erosion Solutions (www.soxerosion.com), a firm that owns several patents for its shoreline and hillside restoration products – ShoreSOX and DredgeSOX.



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"It quickly became clear that the increase of the mosquito population was the result of other environmental issues and structural problems that prevented the retention pond from doing its job of controlling flooding."



The SOX material is laid out and the staking system is pounded in place.

"One problem led to the next. What started out as an extermination issue cascaded into a total environmental hazard—collapsed land, build-up and accumulation of sediment in the pond, stagnating water, invasive plant species, and an increase in algae that compromised water quality."

These were among the factors that created more breeding areas for mosquitoes and dangerous conditions for workers.

In short, there was a domino effect that resulted in a number of problems including the mosquito infestation.

DGC Environmental Services (www.dgcenvironmental.com), an experienced stormwater maintenance company providing a full spectrum of environmental services for public and private entities, put in place a comprehensive plan to not only reduce the mosquito population but also to solve other structural and environmental issues within the body of water.

DGC and SOX Erosion Solutions realized that corrective issues could not simply be limited to spraying the area with chemicals to control mosquitoes. Rather, it would be a comprehensive strategy that included repairing the culvert along with shoreline stabilization using a bio-engineered vegetated system that Mother Nature intended.



Using an amphibious work boat, pond sediment is dredged into the SOX system to stabilize the shoreline.

The shoreline restoration started with the installation of DredgeSOX, a long-lasting and eco-friendly erosion-control technology. It is also an effective way to remove sediment from waterways and reclaim shorelines that complies with all Best Management Practices of "Living Shoreline" restorations.

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"In layman's terms, we are filling a huge specialized mesh sheet with rich organic sediment dredged from lake bottoms," said Leeds. "It is then secured to the shoreline, re-creating the original and now living lake bank."

"In addition, the dredging process improves water flow, reduces pollution and nutrient loading, and starts the process of re-building healthy wildlife habitats. It also removes years of accumulated leaves and grass clippings."

Once filled with sediment, the DredgeSOX material is secured to the shoreline. Sod and other landscaping is planted and then roots through the knitted mesh, creating a long-lasting, living shoreline.



A combination of dredged sediment and excess fill from the project fills the SOX system and then secured by pound the staking system subsurface.

In the case of the Augusta retention pond, the DredgeSOX process also cleared sediment from the mouth of the culvert and promoted healthy water flow. The other major benefit was stabilizing the collapsed shoreline, making it safer for crews to mow and perform other maintenance work.

DredgeSOX stabilized the hillside adjacent to the culvert. This secured the land and prevented torrents of water from damaging the repaired cement culvert. The SOX reinforcement mat was also installed under water at the mouth of the culvert to further stabilize the bottom. Several tons of rocks were loaded onto the mesh to strengthen the pond bottom and enhance water flow out of the culvert.

The key to the success of the project was that the property owner and city officials realized that swarming mosquitoes could not be viewed as an isolated situation. Rather, they recognized that it was a symptom of a much larger problem caused by other environmental factors.

"The multi-tiered approach provided a long-lasting, environmentally sound solution," added Leeds. "Everyone benefited by taking the long look. Mosquito population was reduced without the over-use of harmful chemicals. By re-establishing the shoreline and dredging, we improved water flow and created a healthy habitat for wildlife. The mesh continues to serve as a filter, preventing nutrient overload from entering the water system. Through these efforts the retention pond was able to serve its original purpose of preventing flooding."

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RESULTS

The major test of the DredgeSOX restoration was yet to come. The installation was completed in August 2018. During the next seven months, Augusta experienced significant rainfall and hurricane conditions.

For example:

1. 42 inches of rain drenched the area, testing the stormwater design
2. More than 28 million gallons of water flowed through the outflow culvert during those seven months

The DredgeSOX system survived these torrential rains and flooding with the following results:

- SOX protected the outside edge of culvert
- The underwater SOX reinforcement mat remained stable, while the rocks were displaced, and water flow was maintained
- SOX survived the rains and prevented further erosion of the shoreline

But there were other benefits resulting from the environmental repair. These include:

- Improved water flow reduced invasive plant species, larvae and mosquitoes
- SOX served as a filter, reducing phosphates, nitrates and other pollutants from entering the pond. Clean water was able to flow to other nearby bodies of water.
- In addition to reclaiming shorelines, the DredgeSOX process increased water depth while decreasing the actual size and circumference of the pond.
- With the reduction of invasive plants and improved water flow, the area became a healthier habitat for wildlife.



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