Setting the Sound up for Success:

Deploying remotely-set disease-resistant oyster seed in biodegradable netting on a natural bed in Connecticut.

"Just another day at the office," Inke jokingly encourages me as we hand shovel thousands of dried oyster shells into the bed of a pickup truck. I smile wryly as I try to use my legs to lift and shovel instead of my dully burning back. My time as an undergraduate researcher with the Bureau of Aquaculture has just begun and, already, I find myself shoveling oysters again. "Piece of cake, I got some good training in last week at the docks," I replied a bit sarcastically. My first shoveling experience was beside the oyster fishermen of Norwalk, Connecticut. This was definitely easier. With even greater ease, Inke lifts another pile. She seems to delight in the hard work and gives off an air of inspiring perseverance. These oyster shells, or cultch, are soon to be dumped on our research plot to serve as a hard bottom for the summer oyster recruitment in Long Island Sound.

Undergraduate researcher Hillary Kenyon places a bag of seed oysters on cultch into the back of a truck. Each bag of oysters was hand sorted and placed inside the New Zealand mussel socking. The biodegradable netting is supposed to serve as a predator deterrent in the early stages of oyster growth. Photo by: Inke Sunila.

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The eastern oyster, *Crassostrea virginica*, is a keystone species in Connecticut's coastal environment. Like the wedge-shaped keystones of ancient Roman arches, the oysters of the Sound bring together the building blocks of the ecosystem and help to maintain its healthy state. Connecticut oysters are the predominant filter-feeding organisms in their environment and are critical to preserving good water quality. Siphoning gallon after gallon of water, oysters act as sieves as they feed, improving the Sound's health.

A resilient species, these oysters flourish throughout the Atlantic coast and much of Connecticut's seafloor is mapped and managed shellfish growing areas. It is here that oyster farmers toil away for grueling hours to provide the market with some of the best quality oysters in the world. Nevertheless, the industry has seen considerable fluctuations in years past. Disease outbreaks, and extensive time periods with little natural oyster settlement, have caused years with minimal harvests and overall irregularity in the industry.

In an attempt to shed some light on these issues, Connecticut Sea Grant has provided funding for a research project that aims to re-stock and enhance Connecticut's natural oyster beds. In the case of a disease outbreak, or during a time with little to no natural recruitment, this method would provide an economic cushioning for the oyster industry. Headed by Inke Sunila, shellfish pathologist from the Department of Agriculture/Bureau of Aquaculture, the research employs a biodegradable mussel netting or sock used to deploy hatchery-reared remotely-set disease-resistant oysters. The idea behind this component of the research is that the socking

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provides a degree of protection from predators.

Inke, an opinionated yet lighthearted woman who hails from Finland, is the brainpower behind the project. With a diligent work ethic and lifetime of experience with shellfish, she has adopted the remote setting technique for a novel purpose – to boost the oyster seed supply for Connecticut's commercial industry. Conventional culturing practices involve hatchery-raised oyster larvae settling on tiny shell fragments. This produces single (cultchless) oysters that require a nursery stage, elevated from the sea floor in either submerged cages or bags. Remote setting, however, circumvents this phase and allows oyster larvae to settle on full shells as they do in the wild. Just as natural set, settling on cultch enables hatchery-raised oysters to grow directly on the bottom. Using previously developed hatchery techniques, Karen Rivera and Kate Blacker of the Noank Aquaculture Cooperative conditioned and spawned the disease-resistant "Clinton" oysters. Larval oysters were then allowed to settle on cultch and grown in mesh cages prior to deployment.

On a sunny afternoon in early June, I arrived at the Bureau of Aquaculture lab in Milford. As an undergraduate student researcher from the University of Connecticut serving as one of the investigators for the project, I accompanied Inke to the Norm Bloom & Son oyster fishing dock in Norwalk. To prepare the shellfish grounds for the experiment, the first order of business was to relocate existing shellfish, predators and other marine fauna from the lease. This was done by dredging. Captained by Jim Bloom, the dual-armed dredging boat repeatedly dragged along the sea floor and lifted the load onto the deck. An enormous pile of oysters, clams, snails, crabs, and other creatures quickly mounted as I scurried around the deck collecting and identifying specimens. When the pile towered over ten feet, the captain retired the dredge and headed back to the dock. The lease was then ready for the project and we had a clear picture of what species inhabit the area. "Just another day at the office," Inke smiled as she drew in a deep breath of salty air before stepping off the docks.

A few weeks later, Tessa Getchis, aquaculture extension specialist from Connecticut Sea Grant, met Inke and me at the lab. It was the day we set aside to mark the experimental grid. Like all scientific research, however, a seemingly simple task proved to be more difficult in the field. In this case, the area is about two feet deeper at low tide than the charts show. Though not a problem for the oysters, it was a great difficulty for two women in wetsuits. As our feet barely grazed the bottom, Tessa and I awkwardly moon bounced along as we measured and buoyed the transects within the lease.

The next day, Kate arrived at the Milford lab with her rumbling red truck filled with bags of oyster seed. She proudly released the tailgate and carefully lifted a mesh bag from the truck bed. We immediately lit up as Kate placed the bag on the outdoor picnic table. Only a few millimeters in length, the oysters clung to the shells upon which they settled.

"They look amazing!" Inke exclaimed, as I examined a single cultch shell covered in baby oysters. Tessa nodded in approval. At this point, our all-women research team had gotten off to an assuring start and eagerly sorted the oysters for deployment.

A few hours later, we reloaded the truck and set off for the Bloom oystering dock once again. The plan was to manually deploy the oysters on the lease, now marked with bamboo poles and cinder blocks. In due time, the oysters were released over the boat edge: half with the biodegradable netting, and half without. Both types of nets used were predicted to serve as predator deterrents in the early weeks after deployment, when growth is most critical. Bare (seedless) cultch was also deployed on the lease to serve as a comparison to natural oyster recruitment for this season.

In order to track growth and survival rates, we have begun a monthly sampling of the oysters that will continue into the next year. We hope that this approach of using biodegradable netting for oyster bottom culture has the potential to promote Connecticut oyster production in many ways. This form of remote-setting disease-resistant oysters could potentially enhance currently unproductive natural beds and provide further economic prosperity. In terms of ecological significance, establishing successful beds will also promote better water quality, overall improved biodiversity, and health of Long Island Sound.