

A vertical photograph of an underwater seagrass meadow. The water is a clear, vibrant blue-green, and the seagrass blades are long, thin, and densely packed, creating a lush, textured appearance. The lighting is bright, highlighting the green of the plants against the blue water.

UNDERSEA GARDEN:
*Vital to the marine ecosystem,
seagrasses are under threat
globally.*

BY & LARGE

SEEDS OF SUCCESS

Splendor In The Grass

*VIMS is a global leader in
seagrass restoration.*

BY SARA PICCINI

IN THE 1930s, DISEASE AND A DEADLY HURRICANE wiped out the eelgrass that had flourished in the shallow bays along Virginia's Atlantic coast. The abundant bay scallop population, deprived of its habitat, collapsed as well. The coastal waters lay barren for decades.

Then along came a gardener.

Beginning in 1999, Professor Robert "JJ" Orth of William & Mary's Virginia Institute of Marine Science (VIMS) organized a team of colleagues, students and citizens to sow eelgrass seeds along Virginia's coastal bays and lagoons — a novel method of undersea gardening Orth had pioneered in Chesapeake Bay.

"From the 72 million seeds we've put into individual plots, the plants that have survived, grown, flowered and produced their own seeds have spread, contributing to the 9,000 acres of seagrass we have today," Orth says.

Those 9,000 acres represent 75 percent of the world's restored seagrass — the largest single example on the planet. "In 20 years, we've done something that no one has ever seen before in terms of the scale of the project and the rate that these plants have spread," Orth says.

"I'll never forget one of the first times going with JJ to collect seeds. You stepped out of the boat onto

BY LARGE



mostly bare sand,” says Laura McKay, manager of the Virginia Coastal Zone Management Program (CZM) at the Department of Environmental Quality, which has helped underwrite the restoration project since its inception.

“Going out years later, you’d jump overboard and it’d just be a sea of squishy spaghetti under your feet — eelgrass was everywhere!”

THE STONE SOUP APPROACH

Instrumental to the project’s unprecedented success, McKay emphasizes, is the long-term collaboration among a variety of organizations, state and local agencies, and individuals.

“No single entity has the capacity to do it alone,” she says. “It takes tapping the expertise of a lot of different people and a lot of different funding sources.”

To cite just one example — among its many contributions, The Nature Conservancy (TNC), which owns and manages many of the coastal barrier islands along Virginia’s Atlantic coast, has provided storage tanks for the eelgrass seeds. The seeds are harvested in the spring by the many volunteers who come out to the bays with TNC staff, then are stored over the summer and planted in the fall.

Virginia CZM gave essential “seed money” to the project at the outset and has provided ongoing funding through NOAA, the National Oceanic and Atmospheric Administration. “Because NOAA is in the Department of Commerce, it’s not just about environmental protection, it’s also about sustainable economic development,” McKay says. “It really puts us in this position of trying to help coordinate solutions to problems in a big picture way.”

McKay notes that the Virginia Marine Resource Commission’s Recreational Fishing License Fund is a key source of continual funding; other significant support has come from NOAA’s American Recovery

and Reinvestment Act and the U.S. Army Corps of Engineers, along with private contributions from the Keith Campbell Environmental Foundation.

“It’s kind of the stone soup approach,” she says. “Everybody brings what they have, and the next thing you know you have a feast.”

That feast may soon include bay scallops, which have been re-introduced to Virginia’s coastal waters thanks to a partnership among VIMS, TNC, CZM and the VMRC.

The fledgling crop may eventually be able to support a scallop aquaculture industry and recreational scalloping as well. “Wouldn’t it be great if you could go out on your kayak, scoop up some scallops, take them home and cook them? They are delicious,” McKay says.

The restoration project has already proved to be a boon to Virginia’s Eastern Shore economy. Through its Seaside Heritage Program, a public-private partnership created in 2002, Virginia CZM has fostered the growth of aquaculture, recreational fishing and ecotourism — generating millions of dollars in visitor spending and adding significant numbers of new jobs.

And the world has taken notice.

“JJ’s seagrass restoration project is a great example of how finding a practical solution that benefits the local ecology can also create important economic and global impacts,” says VIMS Dean and Director John Wells. “People in places as far away as Australia and Norway are seeing a resurgence of seagrass in their areas, thanks to methods JJ developed here at VIMS.”

FROM THE EASTERN SHORE TO WESTERN AUSTRALIA

Orth’s seagrass restoration efforts began decades ago in the 1970s when he joined the VIMS faculty. In 1978, he started the Submerged Aquatic Vegetation Monitoring and Restoration Program — commonly known as the SAV Program



SEED MONEY: Virginia’s Coastal Zone Management Program, headed by Laura McKay (above, left), provided key funding for the restoration project.



ONLINE: To learn more about seagrass restoration efforts, check out our video by visiting magazine.wm.edu/seagrass.

— which provides crucial data on the health of Chesapeake Bay.

In the lab, Orth and his VIMS colleagues pioneered the study of flowering and seed production in seagrasses. “If you looked at the terrestrial literature, this process was well known. I wondered, ‘How come we haven’t been talking about it for seagrasses?’ I think we opened a very interesting view to researchers around the world about the importance of seeds in how seagrasses survive and spread and move from place to place.”

“JJ is an elder in the seagrass world — one of the top 10 in the world, if not the top five,” says Professor Gary Kendrick of the University of Western Australia in Perth. “And he’s got so much energy — he’s such a positive fellow.”

Orth’s optimism has enabled him to persist against long odds. “There are a quarter million species of plants on the surface of the earth, whereas there are only 72 species of seagrass,” Orth notes. “The aqueous environment is very challenging. Plants as well as humans don’t like too much salt.”

“Seagrasses also need more light than any other living plant,” Orth adds. For this reason, he calls them the “canary in the coal mine” in terms of monitoring water quality.

Although seagrass species are few in number, they are found throughout the world and form a critical element of the global ecosystem. They provide a habitat for shellfish and finfish, serve as a food

source, absorb wave energy and take up phosphorus and nitrogen from fertilizer runoff. Like temperate and tropical forests on land, they also store carbon.

Orth and Kendrick are currently collaborating on a six-year restoration project for the threatened seagrass *Posidonia australis*. “We found the biggest bottleneck is between the seed and the one-year-old recruit,” Kendrick says. “So the first year of life, you’re literally going to lose 99 percent of the seeds or more. The worst-case scenario in a polluted area is 99.9 percent.”

“So what do you do? You do what JJ did. You collect tens of millions of seeds, you distribute them in concentrated areas, and the percent that will persist into juveniles will be enough. One percent of a million is still a significant number.”

A CLEAR VISION

VIMS’ seagrass restoration program is proof that a small project can grow to have a huge impact, not just regionally but globally.

“We were out on the water with a group recently, and a guy from The Nature Conservancy reached down and caught a bay scallop in his hand. You just think, wow, there was nothing there and now there are over 9,000 acres of seagrass,” says McKay.

“I think that’s an important thing for the public to understand. It’s the consistency and the persistence to keep going, and having a clear vision and goal like we did. It’s incredibly fulfilling.”

BY LARGE

SCALLOP COMEBACK: VIMS Professor Robert “JJ” Orth (below, left and opposite page) has led the effort to bring bay scallops back to Virginia’s coastal waters.



