

Wetland Wire

The Newsletter of the Duke University Wetland Center, Nicholas School of the Environment



Online Edition

Fall 2020

DUWC Launches a Major Expansion of Research, Teaching, and Outreach

The Duke University Wetland Center is marking its 30th anniversary this year by kicking off the largest expansion of research, teaching and outreach programs in its history.

Plans for the multi-year expansion include opening a Wetland Center branch at the Duke University Marine Laboratory in Beaufort, N.C., and developing new programs on wetland and coastal restoration, coastal resilience and carbon neutrality for students at the Marine Lab and on Duke's Durham campus, said Director Curtis J. Richardson.

On the research front, the center is broadening the scope of work at its 10,000-acre "carbon farm" in eastern North Carolina to ramp up long-term field trials on the impacts of peat bog restoration on biodiversity, carbon storage and saltwater intrusion.

It's also planning bioengineering studies to explore potential medicinal and pharmaceutical uses for microbes found in these peat bogs and chemical compounds produced by native plants that grow there.

The center's research and teaching portfolio will further expand this summer when Brian Silliman, Rachel Carson Distinguished Professor of Marine Conservation Biology at the Nicholas School, joins it as associate director.

"Brian brings a new dimension through his expertise on food webs and the conservation and restoration of coastal and marine ecosystems, which complements our existing strengths on terrestrial and freshwater systems," Richardson said.

To build on these combined strengths, Silliman and Richardson have developed a new interdisciplinary initiative called Duke Restore that will be based at the Nicholas School and Wetland Center but will engage expertise from Duke Marine Lab, the River Center, Nicholas Policy Institute and across Duke's campus and beyond.

"Duke Restore is an inclusive, university-wide initiative focused on creatively building ecosystems to help humans and nature" Silliman said. "The idea is to form many Duke Restore teams with experts and students from diverse fields and sectors, and cross-pollinate our areas of individual expertise to find new approaches to critical issues in coastal conservation and restoration, starting with issues we're facing right here in North Carolina," Silliman said.

For example, A "Living Shorelines" team of experts has already been formed and is working with the U.S. Marine Corps and the Pew Charitable Trusts to restore oyster reefs and eroding shorelines at the Marine Corps Air Station at Cherry Point, N.C.

"Increasingly, there's a mandate to rebuild coastal ecosystems to benefit people and nature," he said. "Duke Restore fits right into that and will help position us at the forefront of global efforts."

"Ultimately, we want the Wetland Center to become a generator of ideas and a nexus of collaboration," said Richardson.

And if it becomes an engine for sustainable development across ecosystems, too, so much the better.

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Return to Classes: DUWC and NSOE Offerings

Fall Term 2020 will be unlike any other term in the Duke University's history. Following last spring's shutdown in the wake of COVID 19, Duke's [Return to Campus](#) plan saw the gradual resumption of research and administrative activity. Now, with students coming back to campus for the start of classes, the University's mission is now fully up and running

The Wetland Center's is offering [ENVIRON 812](#) (Wetlands Ecology and Management) this fall. It is the prerequisite for spring term's [ENVIRON 809](#) (Wetland Restoration) as well as a number of other courses. [ENVIRON 808](#), a course in aquatic and wetland field skills, will also be offered in the spring.

A list of all [Nicholas School classes](#) is available online.

RECENT DUWC PUBLICATIONS

Avellan, A., M. Simonin, S.M. Anderson, N.K. Geitner, N. Bossa, E. Spielman-Sun, E.S. Bernhardt, B.T. Castellon, B.P. Colman, J.L. Cooper, M. Ho, M.F. Hochella Jr., H. Hsu-Kim, S. Inoue, R.S. King, S. Laughton, C.W. Matson, B.G. Perrotta, C.J. Richardson, J.M. Unrine, M.R. Wiesner, and G.V. Lowry. 2020. Differential reactivity of copper- and gold-based nanomaterials controls their seasonal biogeochemical cycling and fate in a freshwater wetland mesocosm. *Environmental Science & Technology* 54(3):1533-1544.

<https://dx.doi.org/10.1021/acs.est.9b05097>

Bachand, P.A.M., P. Vaithyanathan, and C.J. Richardson. 2020. Phosphorous removal improvements and cost reductions leveraging cationic polymers and anionic polyacrylamides in chemically enhanced treatment wetland systems. *Ecological Engineering* 146:105722.

<https://doi.org/10.1016/j.ecoleng.2020.105722>

Behringer, D.C., B.R. Silliman, and K.D. Lafferty, eds. 2020. *Marine Disease Ecology*. Oxford University Press.

Pan, X., Y. Ping, Y. Hu, Y. Song X. Zhang, W. Li, L. Cui, and Jan Vymazal. 2020. Species traits and decomposability predict water quality changes during litter submergence. *Science of the Total Environment* 712:135581.

DOI: 10.1016/j.scitotenv.2019.135581

Smith, C.S., M.E. Rudd, R.K. Gittman, E.C. Melvin, V.S. Patterson, J.J. Renzi, E.H. Wellman, and B.R. Silliman. 2020. Coming to terms with living shorelines: A scoping review of novel restoration strategies for shoreline protection. *Frontiers in Marine Science* 7:Article 434.

<https://doi.org/10.3389/fmars.2020.00434>



Carbon Farm Research Continues Amidst Pandemic

In December 2018, the Duke University Wetland Center and Carolina Ranch reached an agreement to create a 10,000-acre carbon farm on a tract of pocosin peatlands in eastern North Carolina formerly drained for agriculture. Carbon farming is a new approach for fighting global warming that uses enhanced land management and conservation practices to increase the amount of carbon that current or former agricultural lands pull out of the air and lock away in their soil and vegetation. Rewetting and reverting the former peatlands at Carolina Ranch to their natural wetland state will significantly increase their capacity for long-term carbon storage.

When fully operational, the farm could potentially store enough carbon to offset much of the university's carbon emissions and help Duke meet its goal of achieving carbon neutrality by 2024. Offset credits not used by the university could be sold to others.

In February 2020, in what we now know were the last days before the COVID-19 outbreak, Wetland Center researchers were down in Hyde County installing eddy flux towers. These towers are recording atmospheric CO₂ flux 24/7, important data for the climate-change related carbon sequestration study. DUWC members Bryan Stokes-Cawley and Neal Flanagan put the final touches on the set-up, Bryan climbing to the top for a final adjustment. The fencing protects the sites from the bears that live on the coastal-plain pocosins.



During this spring's lockdown orders, Wetland Center researchers were able to do data analysis and writing from home. Duke's staged reopening plan allowed the safe and gradual resumption of lab and field activities in June and July. With regular trips to the research site now possible, the scientists can ramp up the long-term field trials on peat bog restoration's impacts on biodiversity, carbon storage and saltwater intrusion.

Explaining the importance of the carbon farm work in the fight against climate change, DUWC Director Curtis Richardson said, "Given the success we're having, I think there's a very good chance that the farm can serve as a prototype for expanding carbon farms to hundreds of thousands of other acres across eastern North Carolina and the region."

THE MERCHANT'S MILLPOND

**We drifted too,
that Blackwater pavement
with speckled copper hues.
For some, the Avenue a dismal maze.
For us, a spot of muse.**

**A silent stop
on fluted shags—
we rest on scaly knees.
The gleying Millpond's signature
a pulse sensed on the trees.**

**Needles, plates
around us moved
peat plumes strike our nose.
Those bearded strangers looked at us
on duckweed paths we froze.**

**Were we lost
or had we found
a secret in the swamp?
Something sacred in the land
a place we shouldn't tromp?**

**That heavy air
was charged with life
though time there did stand still.
Friction felt beneath our boat—
the current brought a chill.**

Alex O'Neill

Alex O'Neill (MEM 2019) was awarded a Nicholas School assistantship in the DUWC laboratory for the 2017-2018 school year. He wrote *The Merchant's Millpond* after a visit to Merchant's Millpond State Park in Gates County, North Carolina. The poem won the *Eno Magazine* 2018 poetry award and first appeared in that publication's Issue 7. It is reprinted here by permission of *Eno Magazine*. (<http://www.enomag.org/>)

