Climate change is becoming a challenge for individuals, communities, and countries across the world. But the Great Lakes ecosystem will face its own set of trials (and advantages) as the local climate shifts along with the global. And while community managers, policy makers and public health officials are dealing with the effects of climate change on the region, teachers are looking for materials they can use to teach the next generation of Great Lakes residents about a changing climate.

Ohio Sea Grant first created the Great Lakes Instructional Materials for the Changing Earth System—more commonly known as GLIMCES—in 1995 in an effort to provide teachers with lessons and activities that helped students localize climate change to their own backyard instead of seeing it as an abstract global phenomenon. Along with 1993’s Activities for the Changing Earth Systems (ACES), these lessons allow Great Lakes teachers to include climate change into their courses without having to start entirely from scratch.

But science never stands still, and with 20 more years of climate change research available, an update to the curriculum is in the works. Leading the effort are Dr. Rosanne Fortner, Ohio Sea Grant’s former Education Coordinator and an integral part of its education efforts for over 30 years, and Lyndsey Manzo, Ohio Sea Grant Educator and a classroom teacher at Westerville North High School, near Columbus.

“The curriculum is there, we do not need to reinvent the wheel,” explains Manzo. “What we need to do is update the data, so we’re taking selected activities from GLIMCES and ACES, and we’re updating them not just for the climate science, but also for the pedagogical structure.” That structure will now follow the “Five E’s” of classroom teaching: engage, explore, explain, extend, and evaluate.

Another change will be the layout of the activities, which takes full advantage of the curriculum’s new online format. “Now that we aren’t relying on a printed product, we have the ability to make everything much more efficient,” Manzo says. “We can have a teacher page, and we can have a student page that’s basically a prepared worksheet. We’re also able to use electronic links and data sets that are always updating online, so students can see interactions and simulations on the computer. It allows us to use our educational technology better, in addition to using more current data.”

Having a regionally focused curriculum available helps teachers take an abstract concept like climate change and relate it to students’ lives right here in the Great Lakes region. “There are great climate change activities out there, but they’re often on a global scale, or they’re on a regional scale but it’s not our region,” Manzo says. “They’re focusing on the Arctic, or they’re looking at alpine glaciers of the Himalayas. That’s really hard for students to grasp when you’re here by the Great Lakes.”

Feedback on the old lessons has been overwhelmingly positive, and the updated curriculum is likely to continue that trend. “There is practically no workshop I’ve ever done where some teacher didn’t say ‘where have you been all my life?’” says Fortner.

“The biggest challenge we have in Sea Grant education is not getting people to use the curriculum, it’s that people don’t know the curriculum is out there. That’s why we keep...
sending people to teacher conferences, why we keep writing about them and so forth. There are new people that come to the teaching profession every year, and we always have a fresh audience to work with."

That audience has a number of options for learning how to integrate the climate change curriculum into their classrooms. This summer, Ohio State University's Stone Laboratory on western Lake Erie is offering "Climate Change Education," a one-week course that introduces classroom teachers, education students, and informal educators to the science of climate change and the opportunities inherent in having a regional curriculum at hand.

Like all Stone Lab classes, Climate Change Education is hands-on. "The focus of the class will be on making the new curriculum available," says Fortner. "We'll have presentations about the science content, but the way that I teach is to learn by doing. Rather than give a lecture and then a lab, I would prefer to have the lab and then a discussion with the students." In that spirit, students in the course will visit some of the Lake Erie islands to look for evidence of change over time: in the orientation of glacial grooves, in the growth of the trees on the islands, and in the size and arrangement of sand and pebbles on the islands’ beaches.

They will also work through some of the curriculum activities they may later present to their own students. "Participating educators engage in the activities very much the way they would in their own classes," Fortner says. "It helps them to see in advance what they still need to change for their class, what things won't work at all for them, things like that. It's a very useful way to prepare for your own use of the materials."

For teachers that are unable to attend a week-long class, Ohio Sea Grant will be offering two one-day professional development workshops, as well as a webinar, to allow more educators to fit these trainings into their schedule. Dates for these programs are now available at ohioseagrant.osu.edu/events, and registration information will be added shortly.

While current teachers have traditionally made up a large proportion of curriculum users, pre-service teachers (education students preparing for the profession) also benefit from targeted climate change education, Manzo believes. "There's certainly value in doing professional development for current teachers because they know exactly what they need in their classroom," Manzo says. "But at the same time, I think there's a huge value in serving pre-service teachers and people that are getting their teaching certification. Very few programs require a specific course in climate change, so they really don't look at it as a systems approach. Climate change spans many disciplines, so there's value in not just teaching the science, but also the pedagogy: here's the climate science, and here's how you convey it to your students." TL