Full-Contact Ecology
Dan Bisaccio, Souhegan High School, Amherst, New Hampshire

Several years ago, a student in my class, also a starter on our high school’s football team, sprained his ankle while running from a hor- net’s nest while conducting biodiversity research. When his perplexed coach asked how he had hurt himself, the student’s response was that he was taking full-contact ecology. We know that only by urging them to become hunter-gatherers of information, knowledge, and skills will students connect their work to a broader community, and create enduring understanding.

Aldo Leopold writes that “There are two spirituals in me: one in me that loves a farm. One is the danger of supposing breakfast comes from the grocery, and the other that heat comes from the furnace.” When I ask my students to sketch an insect, I find that students not only have difficulty locating where they need to place appendages on insects, but also where all that sustains us as humans comes from. It has become an abstraction for all too many of my students. The word “ecology” comes from the Greek word “oikos” – the study of our house. Full-contact ecology provides a way of establishing the context for study of “our house” — our culture, our society, and our children’s future.

I teach conservation biology at Souhegan High School (SHS) in Amherst, New Hampshire. I am also an adjunct biodiversity researcher for the Smithsonian Institution’s Monitoring and Assessment of Biodiversity (SIMAB) program. In 1996, I developed a program, HabitatNet for my SHS students as well as other students and teachers around the globe. HabitatNet directly involves students and teachers with conducting authentic biodiversity research while learning science as science is done.

Using the SIMAB permanent biodiversity research protocols, my high school students have been collecting biological research data at field sites in New Hampshire, Central America, the Caribbean Islands, and Mexico for the past eight years. The overall goals of HabitatNet are (1) to develop conservation biological literacy in high school students by giving them an opportunity to learn field methods and applications while collecting and interpreting biological diversity data, and (2) to establish baseline biological diversity data at our HabitatNet field sites. Thus far, over five hundred high school students have been involved with this project. They write annual field reports for the Smithsonian Institution in Washington, D.C., various conservation agencies throughout the Caribbean, and El EdenEcological Reserve located in Quintana Roo, Mexico. Field reports include 20 m x 20 m forest quadrant tree maps; vegetation analysis (tree species frequency, dominance values, and density statistics); and invertebrate and vertebrate species lists. Additionally, concurrent student research projects complement the basic biodiversity data that is collected using the SIMAB protocols. These research projects are designed by students and conducted by them in the field. Their focus of research is on an aspect of anthropogenic or “natural” disturbance regimes as they pertain to biological diversity.

The fact that our students and I had ten years of data recently earned us the opportunity to travel to El Eden to share our work with university and Ph.D candidates as we began our assessment of hurricane Wilma’s damage to our biodiversity plot. Traditionally, principal investigators for the National Science Foundation are college professors and their graduate students. Our ongoing relationship with the Conservation Biology Center at the University of California Riverside (UCR) included an earlier collaboration on a joint publication of a text (The Lowland Maya Area; Three Millennia At The Human-Wildland Interface, Hayworth Press, 2004). UCR’s research has centered on how recently disturbed forests of the Yucatan recover from anthropogenic disturbances while our SHS HabitatNet research has focused on the long view of forest successional patterns. Our 10 year research has indicated that even “mature forests” show past disturbance regimes and selective forestry practices by early through mid-20th Century Mayan people.

Souhegan Seniors Nate Langille and Julia Day accompanied me on this trip. They had first traveled to El Eden as part of a Global Use Symposium of 80 students from Saba, India, Germany, Mexico, Italy, Spain, and several states. Souhegan’s students served as teachers for the field work, as they had been trained in field protocols. Students developed the Youth Accord on Biodiversity for the United Nations. In December 2005, Nate and Julia served as graduate students, along with Ph.D candidates from the University of California, Riverside. Our task was to record the destruction of hurricane Wilma, the strongest hurricane ever recorded. Its 140 mph winds had swirled over the Yucatan for 36 hours in October. Trudging through waist-high water, yielding machetes to clear a path, we studied the changes we observed. We measured the height of the snapped trees, the number of trees felled, the size of the trees, and the species that had withstood the violent winds.

Julia noticed the effects of changes in the density of the canopy. “With all the leaves stripped from the trees, we observed vast changes in light that would definitely affect species’ growth. We wondered what plant species would adapt and/or recover from the change in canopy density.”

Nate observed a significant change in wildlife behavior following the storm. “When we were first in the Yucatan, we saw very little wildlife. The canopy hid their presence. With the land exposed to the elements, the animals were willing to gather for food. Their behavior changed; they seemed to seek us out. I was fascinated by their rapid adaptability to changed circumstances.”

What impressed me watching my students work with college professors and graduate students is that we were all teachers with distinct skill sets to share. My students were functioning as scientists at a field research site—their tests were designed by their environment. We all shared expert status. I became Nate and Julia’s students on our last days in the field. They knew that a friend with dwarfism would accompany the next student group to El Eden Reserve; as we cleared trails and cleared paths, they urged me to do a better job so that the student would be able to participate fully in the field experience.

Julia and Nate serve as exemplary witnesses to the value of authentic learning. Julia realizes fully that “the most minute event affects individuals on a global scale.” Nate vehemently states that “you can’t not want to make a difference when you...” (continued on page 10)
Students at the Center

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I received my administrative certification at a time when principals were expected to be instructional leaders. I thought I knew what that would look like, but as a first-year principal, I found myself easily getting caught up in the administrative rather than the “academic” track of leadership. The Effective Principal pulled me back. In this book, Barbara Scott Nelson and Annette Sassi provide concrete examples of instructional leadership by investigating the way in which several principals observe and provide feedback to their teachers’ math instruction.

Educators, just like the students with whom they work, vary in the prior knowledge and experience they bring to the table. When it comes to the study and teaching of mathematics, some elementary teachers shy away from skills that they themselves are not comfortable with. Administrators with similar apprehensions might observe a math lesson with a superficial awareness of conceptual understanding and focus more on whether or not students were able to complete the task or solve the problem.

In mathematics, conceptual understanding must support algorithmic skills. In The Effective Principal, Nelson and Sassi take us into several classrooms where teachers are working on mathematics instruction. Each case study is focused on the principal’s observation, understanding and feedback to the teacher. Nelson and Sassi discuss how the principal’s level of content knowledge impacts the focus of the observation and the feedback provided to the teacher. In each case a deeper understanding of pedagogy and content leads to more focused feedback to the teacher, greater impact to teaching and learning, and improved student success.

I was contemplating my instructional leadership after reading The Effective Principal. As I worked with my third-grade teachers to review their benchmark data, they identified a weakness in the areas of place values and subtraction with regrouping. One teacher insisted that she “teaches” the concept every day (equating additional practice with re-teaching). Another seemed more open to trying an alternative approach. Although both stated they had used manipulatives in the past, they were wary of going back to hands-on with the State test looming in the background.

With Nelson and Sassi in mind, I continued to push the conversation trying to identify where the conceptual understanding of these third graders had broken down. I questioned how continuing to provide algorithmic practice, which had not been successful for the past six months, would help prepare students for the test let alone for future learning in mathematics. The teachers finally came up with a plan for addressing the two areas of weakness and a cooperative way of supporting both classes.

I believe that The Effective Principal is a wonderful tool to help administrators become true instructional leaders and learners. As such, Nelson and Sassi state, “they engage in instructional leadership from a stance of inquiry, that is, a stance of curiosity about how children learn, how teachers teach, why certain instructional strategies work the way they do, or why the teachers in the schools have such a variety of ideas about instructional practice.”

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