

UC Office of the President Transect

Title

Transect 21:1 (spring 2003)

Permalink

<https://escholarship.org/uc/item/9z1684x1>

Journal

UC Natural Reserve System, 21(1)

Author

UC Natural Reserve System

Publication Date

2003-03-21

NRS

N A T U R A L
R E S E R V E
S Y S T E M

University of California

Transect

Spring 2003 • Volume 21, No. 1

A few words from the Director of the NRS

What we need to think about as we go into the 21st century is how to have students who are able to critically evaluate the personal implications of environmental questions.

— George Gray, in Earth Week Conference Proceedings, *Building Environmental Literacy for the Next Century* (April 21, 1999); <http://www.enviroliteracy.org/article.php/453.html>.

Careful reading of the proceedings of *Building Environmental Literacy for the Next Century* provides abundant reassurance of the importance of the undergraduate field courses and the wonderful Sedgwick Reserve-based *Kids in Nature* program described in this *Transect*. In a 1998 U.S. poll of 2,000 adults, ages

Continued on page 15

In This Issue

- 4 *When Nature meets Culture — communication happens*
- 7 *Marsh inspires unlimited projects and new perspectives*
- 9 *Norris field quarter legacy at UCSC lives on*
- 12 *Kids in Nature program takes grade-schoolers inside the out-of-doors*



One UC Davis program uses NRS sites to give humanities students an experience of environment they would otherwise never get — and will probably never forget (story on page 4). Photo by Deborah O'Grady

Bushwhacking 101 offers new take on age-old environmental problems

Harmut Walter doesn't like to follow trails. He prefers bushwhacking through the brush, straight down canyons or up steep hillsides, even when he has a class of 25 students following him. "It can be taxing," the UCLA geography professor admits, "but it's very important. What I provide to my students is access to nature, and I only have limited times and means. That's why the UC Natural Reserve System is so crucial for environmental education."

Since the 1970s, Walter has been bringing students to NRS reserves — primarily the James San Jacinto Mountains Reserve in Riverside County, which is protected, owned, and managed by the University of California, and the Santa Cruz Island Reserve, on the largest of the California Channel Islands, which is

Continued on page 2

Bushwhacking 101

Continued from page 1

protected, owned, and managed by The Nature Conservancy (TNC). Walter explains: “At UCLA, we feel that problems in the environment are not caused by the environment; they’re caused by people, so environmental studies here is more of a social studies program. This is why we have a geography/environmental studies major. But, being part of the geography department, I don’t have access to labs and experimentation. I work in a social science environment, yet I’m teaching a field course, so I really need these reserves to get the students out and acquaint them with the basics of our local and regional environment.”

His course, *Field Analysis: Biogeography*, is taken mostly by seniors. It’s often their first opportunity to get out into the field and use methods they’ve studied in classrooms. Many have a limited understanding of the southern

California environment. “Our students may learn a basic knowledge of nature as youngsters,” Walter notes, “but they lose it as teenagers. So when we get them at 20 or 21, they don’t know anything anymore. They don’t know what an oak tree looks like. They can’t identify a pine.”

Walter’s goal is ambitious. In one academic quarter, he wants to transform his students into environmental scientists who can tackle the complexities of field research. He begins with a series of day hikes in natural areas near campus. “First, the students have to be able to identify things,” he stresses, “so I take them hiking in the Santa Monica Mountains or visit Malibu Lagoon. Fortunately, they learn very quickly and feel really proud. Many tell me that they take the same hike a few weeks later with their friends to show them what they’ve learned. It means a lot to them.”

Once they’ve built up a basic knowledge of the southern California envi-

ronment, the students are ready for a weekend visit to an NRS site. Walter knows both the James Reserve and Santa Cruz Island extremely well; over the years, he has developed an intensive learning program for each site. At Santa Cruz Island, for example, the students spend the afternoon of their arrival getting an overview of the different ecosystems on the huge 46,000-acre TNC preserve and learning a few field techniques, like vegetation transects or animal behavior observations.

Early the next morning, Walter takes them on an exhausting itinerary over the island’s torturous roads. At each stop along the way, the students benefit from his deep understanding of the island’s ecosystems. “First, we go to a pine forest,” Walter begins, “where we leave the car and hike up to the Sierra Blanca, which is a beautiful area of calcareous rocks with a lot of old dead pines. For years, no new pines grew because sheep ate the young trees. Now that the sheep are gone, a forest of new pines is growing. I wrote a paper on the pines, so I’ve done research there. We also see a lot of *Dudleya saxosa* (a succulent commonly found in the Mojave Desert) growing on the rocks. The sheep were wiping them out as well. Now there are thousands of them. I have photos of the Sierra Blanca ridge from 25 years ago, so the students can see the impact of the sheep.”

“The island is full of wonderful case studies for evolution and what happens in nature,” Walter continues. “We take some time to look at the endemics — the rare ironwood trees, for example, or the arboreal chaparral that is characteristic for some of the Channel Islands. And there are the hybrids of different oak species, manzanita, and monkey flowers. The latter have orange flowers often growing right next to bushes with pure yellow and deep crimson flowers.”



UCLA undergraduates create a transect to survey the succulent *Dudleya saxosa* on Santa Cruz Island. Most are seniors by the time they take Hartmut Walter’s *Field Analysis: Biogeography*— and this class is often their first time in the field, using science methods they’ve studied only in classrooms. Photo by Hartmut Walter

After lunch, the group continues on to Christy Beach to chart the status of the undisturbed dune vegetation. For the last 20 years, Walter's students have been doing transects of the dunes, mapping individual plants and the cover of different species. "We try to find the same places every year," Walter notes, "and compare them with the old data to see what has changed due to winter storms and beach erosion. This gives the students a bit of an idea about dune dynamics, mobility, and succession. They can also jump in the water, if they like, or we might continue out to Fraser Point. It's a long, long way, but in some years the flowering in the coastal prairie can be spectacular."

Many of the investigations during the day focus on problem-solving. "There are a lot of alien species on reserves," Walter explains. "Here fennel is a perfect example, so I divide the students into groups of four to five and send them out with questions. First, they have to identify the problem: *Why is there fennel on the island? Who is moving it? Are there agents that do this? What do the pigs do? How does fennel reproduce and multiply?* Then they have to consider possible solutions. *What could we do to stop it?*"

Even after the group returns to the field station in the evening, the students' day is not done. They still have dinner to prepare and to clean up. Afterwards they begin to work with the data collected during the day. "We have five or six laptops, and everybody is crunching the numbers," says Walter. "By the end of the weekend, most of them are proficient with Excel and have learned a number of quantitative techniques."

Each group then makes a short presentation on their findings. Walter is convinced that the students learn more from this experience than they do from him. "The students are competitive.



UC's field station on Santa Cruz Island. Over the course of three decades, this UC field station site has sheltered thousands of scientists and university students investigating the island's rich biological and cultural resources. Photo by Hartmut Walter

They watch each other. They compare what they did to what others have done. They learn from their mistakes and have no hesitation asking questions or criticizing each other."

The presentations often continue until midnight. Even then, sleep remains elusive. "Camaraderie is very important," observes Walter. "Most university students never camp together or spend a night together in a field station. So we have 20 to 25 bunk beds, and some students talk deep into the night about life, school, and the world. Suddenly, as seniors, they develop new friendships that will last."

Walter sees the results of all of his efforts at the end of the weekend. "The students become more confident," he notes. "They no longer feel helpless in the natural environment because they have the means — the scientific method — to approach important questions. And that's all I really want to show. They don't need to come up with solutions, but we need to train them to ask the right questions and to

find a way to answer questions in a scientific way. And to do that in the field is so much better than in the classroom."

Walter is currently planning new courses around the reserves. This spring he will offer a weekend freshman seminar on Santa Cruz Island that will focus on the island's fragile ecosystem. Walter is arranging presentations by representatives from the UC Natural Reserve System, The Nature Conservancy, the National Park Service, and graduate students working on the island.* "I want to expose younger students to the natural environment and to people who are dedicated to doing things on the island. I want to show them how many different conservation problems exist in California, even on an island like Santa Cruz where pelicans, bald eagles, and peregrine falcons all disappeared. Some of these have come back, but at a very high cost. I hope this will open some of the minds of these freshmen, so they will become

Continued on page 4

Bushwhacking 101

Continued from page 3

more receptive to science or environmental studies.”

Walter is also creating a modular CD-ROM version of his field course. “We will give every student a CD that has some basic information on every part of my field course, with links to data, case studies, and examples. This way, even if I don’t teach this course, somebody else can take the CD and have a much easier time teaching it.”

Walter attributes much of the success of his course to the special environment provided by protected areas: “Santa Cruz Island provides a unique experience, and students realize this. Going to this island is like going to a California that no longer exists on the mainland. It gives students a new perspective.” — JB

For more information, contact:

Hartmut Walter

Geography

Box 951524, 1255 Bunche

(Mail code 152403)

University of California

Los Angeles, CA 90095-1524

Phone: 310-825-3116; 310-825-1071

Email: walter@geog.ucla.edu

**Editor’s note: The Nature Conservancy (TNC) currently owns 76 percent of Santa Cruz Island (~46,000 acres); the National Park Service (NPS) owns 24 percent (~15,000 acres). TNC and NPS work together to preserve and protect the island’s diverse cultural and biological resources and to restore vital habitat for scores of marine and terrestrial plant and animal species. The UC Natural Reserve System continues to operate its field station on site, providing facilities and access to the island for instruction and research, through a license agreement with TNC.*



*Rock Eye #4 (1994). Photo by David Robertson (on the right), from his monograph, *Alternative Medicine**

What happens ...? when nature meets culture — NRS reserves offer a perspective

While most people appreciate the NRS reserves for their natural qualities, UC Davis English professor David Robertson is drawn by their cultural opportunities. For him, the tension between environmental and human factors creates an environment where intriguing things happen. And that makes natural reserves excellent places to work with students.

“You could go a long way and not find a more complex, more controversial intersection of nature and culture than McLaughlin,” Robertson notes as he ponders why the NRS’s McLaughlin Natural Reserve in the Coast Ranges east of Davis is ideal for his teaching style. “You have a landscape heavily impacted by human use. You have a mining company involved in significant environmental restoration and creek monitoring. You have old-timers who have lived back in the hills for generations. You have interesting geology — the whole reason the gold was there. You have all the questions around the serpentine outcrops — how did they get there? what are they made of? You have a pretty long-term data set on the fish in the creeks.”

And it’s not just the McLaughlin Reserve that appeals to Robertson: “The natural reserves, without exception, have really intriguing human interests. These are places where I can take students who are interested in nature, in the wild, and show them that what you see on the ground is often fundamentally, crucially determined by what humans have been doing there before they became natural reserves and, in some cases, even while they were reserves.”

Robertson thrives in the confluence of different streams of thought. He’s an English professor who supervises doctoral students in ecology and oversees the Putah Creek Campus Reserve. His Ph.D. is in biblical studies, but his career has

focused primarily on promoting the study of environmental themes within humanities courses. He's an accomplished writer and photographer who uses science as a point of entry to his subjects and scientific posters as a motif for his art projects.

One thing he makes clear, though — he's not a scientist. He says: "I'm very interested in science, and I often use science in my writing. I take it very seriously, but I don't follow the idealized scientific process. I do, however, try to figure out what scientists are up to from a large perspective."

Robertson's combination of interests made him a primary force in establishing a nature and culture major at UC Davis. The *Nature and Culture* program grew out of the increasing realization that societies have not been very effective in solving complex environmental and social problems, and that new approaches must be tried. Robertson was part of the original faculty group that developed the concept in the late eighties; when the program was established in 1991, he served as its first director.

His hope was to "bring the sciences and the humanities into some sort of extended dialogue." Students in the program must take rigorous courses in both the sciences and the humanities, as well as three core courses. The first core course focuses on the importance of nature in human thought, both scientific and spiritual. The second involves an in-depth study of one or two specific issues. And the third takes students out into the field to "examine the scientific and literary/artistic approaches to the study of nature and culture in a single place."

The field course is a culminating experience for the students, and this is the course that makes use of McLaughlin and other reserves. As Robertson explains:

For all my courses, I use the philosophy that the way to get people from different disciplines to work together is to go to a place and have everyone work on that place. Don't just sit around talking about how scientists and humanists might work together. Go to the place, and the place will present certain kinds of problems, and those problems are very likely to involve scientists, and the public, and political science, and economics, and general cultural issues ... and, all of a sudden, people can bring their expertise to bear on all of these problems in all of their many dimensions.

We want to show students that situations are almost hopelessly complicated, and you need to know a lot and understand a lot of different things. Once you do, you can actually begin to get a handle on the problem, which may not allow you to solve it completely, but will allow you to do some things that are genuinely helpful for plants, animals, and humans.



David Robertson sits at a spatial-temporal juncture of nature and culture discovered at the McLaughlin Reserve. photo by David Robertson

At the McLaughlin Reserve, the students are confronted directly with the complexities and incongruities of the real world. "Even the housing there was very intense," Robertson recalls of the course he co-taught at McLaughlin with its faculty manager, scientist Susan Harrison. "We camped in a level grassy place in front of the core library (a facility in the then-active mine), and we held classes at the picnic tables under a big black walnut tree. The students were alternately appalled at how degraded the landscape was, appalled at the off-road vehicle use and the BLM shooting range just south of the reserve. But they're also very interested in how environmentally conscious the mine had to be to get its permits. They love learning about the serpentine chaparral and the wildflowers that live in the seeps. They love talking to the people who live up in the hills."

The *Nature and Culture* program is trying to accomplish a number of basic goals. One is to break the logjam that blocks communication between differ-

ent disciplines. "When scientists and humanists sit down and talk about what they have in common," Robertson notes, "or about what they might have in common, or about philosophical issues, the conversations very quickly take on a certain shape that is pretty predictable and generally ends up with not much being accomplished. The humanists are likely to say,

'You guys shouldn't be so confident about what you know,' and the scientists respond with, 'This [scientific method] is a pretty good way to find things out, a lot better than your

Continued on page 6

What happens ... ?

Continued from page 5

method.' Once the question gets off on epistemology, you're lost. I find it fun, but not if I'm up to something serious!"

What Robertson wants the students to realize is that science and the humanities are really parts of one joint enterprise: the ongoing effort of human beings to understand themselves and their world. Everyone then has something to contribute if we're ever going to solve our major issues. "[Students] need to know how scientists think and be at least able to work in that method somewhat, and they also need to know what humanists do and be able to think like a humanist. This is crucial because one approach is not going to do the job. At McLaughlin, you have people approaching issues from different perspectives — doing biological research, doing geological research, writing human history, writing animal history ... That's when interesting things begin to happen."

Another goal of the *Nature and Culture* program is to convey a sense of place and a "bioregional awareness." The McLaughlin Reserve is ideal from this perspective, as it sits at the source of Putah Creek, which eventually flows through the Davis campus. Robertson has worked with people from other disciplines at UC Davis — for

example, biologist Peter Moyle and landscape architect Rob Thayer — on the Putah-Cache Creek Bioregion Project, designed to increase the area's bioregional awareness through long-term educational, environmental, and art projects that involve the campus and the larger community.

Robertson believes that information is the key to solving difficult problems and that the reserves can play a valuable role in accumulating this information. He

concludes: "From the point of view of the scientists, the natural reserves are very important ... For the most part, people are not going to destroy their experiments halfway through; the land isn't going to be plowed under or bought out from under them. We always want to manage with good information, but in fact good information turns out to be difficult to come by, and we probably never know as much as we want to know. Nevertheless, we still would like to know as much as we can, and the natural reserves are a place where we have a decent chance of finding out information that will be generalize-able." — JB

For more information, contact:

David Robertson
English
269 Voorhies Hall
University of California
Davis, CA 95616
Phone: 530-752-0698
Email:
darobertson@ucdavis.edu
Website: <http://www.english.ucdavis.edu/Nat&Cult/NAC.html>

tule perch

look at your open palm and imagine
a tule perch
she's no bigger than that born
in a June water smelling of crayfish,
mayfly larvae, the promise of heat,
like me,
she had all her eggs at birth—tiny pin dots
of molecular design but imagine
this—after mating, she stores the sperm for six months
until, in the chill quickening of early spring, perhaps
on a Saturday night,
some gate opens in her center; she joins
eggs to sperm and then—amazing thing—
fish begin to form
fins thin as tissue lace with folds
of perch womb she is a ball, a weighted bobber
imagine forty live fish in your belly—wiggles,
shivering gills, fins and tails flicking—
she hides in brush, a fallen tree, a tangle
of spring weeds, feels the current—a massage
along her grotesque sides—
waits for the incubating waters of June, some singing
of crickets, a certain fullness of moon,
an unfolding on the earth's sure
rotation

— Pamela Moore

This poem appeared in the first issue of *Putah and Cache*, printed in 1998. *Putah and Cache* is published by the Putah Cache Bioregion Project of the Commission on the Environment at the University of California, Davis, an organization created by David Robertson, Rob Thayer, and Peter Moyle. The project involves UC Davis faculty, staff, and students in programs that increase awareness of the local environment. Each year the project appoints several artists- and writers-in-residence whose work responds to the geography, biology, and culture of the area's watershed. Pamela Moore was an artist-in-residence for 1997-98.

San Joaquin Freshwater Marsh Reserve offers UCI students unlimited projects and possibilities

A tour of the San Joaquin Freshwater Marsh Reserve with UC Irvine professor Peter Bowler elicits stories of the classes that have worked there over the years. The large stand of coastal sage scrub on the hillside above the marsh was planted by a restoration ecology class in 1991. The prickly chollas date from the mid-nineties. The vernal ponds that dot an abandoned road near the marsh were dug and “inoculated” by students over the last few years. An osprey nest on a tall post in the center of the marsh was built last summer by visiting high school students. “The osprey arrived the day the post went up,” Bowler adds proudly. “Now we’re hoping for a mate.”

As an instructor, Bowler relishes a class load that ranges from large lecture courses like *Limnology and Freshwater Biology* and *Environmental Ethics* to smaller, more advanced classes like *Freshwater Biology Laboratory*, *Restoration Ecology*, *Horticultural Science*, and a three-quarter *Senior Seminar in Global Sustainability*. For him, the 202-acre San Joaquin Marsh, conveniently situated just a few minutes’ walk from the main UC Irvine campus, has become an inexhaustible source of projects; for the hundreds of students who take Bowler’s classes every year, the marsh is a continuing source of inspiration.

“Students love to get out here and get their hands dirty,” Bowler says. “For most of my classes, visiting the marsh is a built-in component because it’s such a wonderful opportunity to show them nature and the way we can restore nature. Reality is worth a thousand pictures.”

Bowler introduces students to the marsh gradually. Beginning biology students, for example, come just for a docent-led tour. “My best marsh stu-



San Joaquin Freshwater Marsh Reserve. Photo by Peter Bowler



When students get hands-on experience restoring nature, it changes their ecological outlook and makes them much more likely to support preservation efforts. Photo by Pei Hsieh

dents serve as docents,” he explains. “The students learn a lot and so do the docents. We give them a basic script of talking points, and at first they’re awkward and unsure of themselves. But they soon develop their presentation skills. They even develop their own jokes,” he adds with a laugh.

In contrast, environmental ethics students — though they carry out a bit of stewardship work in the marsh, perhaps spending a day removing non-native plants — generally use the marsh as a retreat where they can contemplate nature and write in their journals. “Our students have mostly led an urban life,” Bowler says. “They don’t have a sense of geologic place or a natural history identity. Being able to come to the marsh to write reinforces their relationship with nature. Many of them find feelings that they’ve never had before.”

For the limnology and freshwater biology students, the marsh is a living laboratory. “Having this rich, wetland habitat right on campus is perfect,” Bowler says. “It allows us to go out and sample, and because we’ve gotten grants to restore portions of the marsh, they can see how a wetland is able to grow and develop. We can study it at all stages, from an old marsh that is a remnant of a much larger historic wetland to the new areas we’ve created essentially from scratch.”

Bowler has a long list of activities for his environmental restoration and horticulture students. “They do plantings. They monitor plant survival and health. They compare the success of plants from a native plant nursery with a wild stand of plants rescued from another site. They do water quality sampling. They monitor the extent of growth of these wetland areas we’re developing. They also do specific experiments. One group is studying the caloric content of seeds from wetland plants and how much energy is available to birds and other granivores in the ecosystem. Another group is comparing the success of different restoration models in the wetland.”

Continued on page 8

SJM Reserve

Continued from page 7

As condominiums and research parks crowd the marsh, Bowler, reserve manager Bill Bretz, and their students dedicate themselves not only to protecting the marsh and surrounding hillsides, but also to restoring its ecological function. The area's rich mix of wildlife — including coyotes, bobcats, ospreys, herons, and egrets — attests to their success. Many restoration techniques pioneered at the marsh have resulted in published articles. “We’ve had a number of pieces in *Ecological Restoration*,” Bowler says. “It’s a journal designed for actual practitioners interested in the results of different restoration protocols or the economic feasibility of moving threatened native stands into reserves. The students do much of the research and writing, and get great satisfaction out of seeing the completed articles.”

Bowler stresses that his students are much more than a source of free labor. “If you want hard labor done, you should hire somebody to do it,” he observes. “The students are here for a different reason. They want to stop, and think, and ask questions. They want to experience things they haven’t tried before and consider what’s been accomplished here. They might stop to consider the threatened California gnatcatchers nesting in the coastal sage scrub that other students planted years ago. It’s an escape from all the distractions of traffic and bustle of campus.”

Not all of Bowler’s students will pursue careers in ecological restoration, but all, he hopes, will walk away with a new perspective. “I did a series of studies with colleagues looking at whether or not restoration work affects a person’s ecological attitude and behavior,” he explains. “And it turns out that it has a dramatic influence on how people regard nature. They’re much more likely to support preservation efforts.”

Bowler says his students often return to the reserve five or six years after graduation. “They climb over the fences to see the plants they put in the ground. They come to sort of worship the habitat they helped create. I think subconsciously they want to remember that they did something to stop the complete destruction of habitats in this area. They didn’t just stand by and do nothing. We gave them a way to make a contribution, and they come back to

remind themselves of what happens when you set nature in motion.” — *JB*

For more information, contact:

Peter A. Bowler
Academic Coordinator-Irvine Reserves
Ecology and Evolutionary Biology
University of California
Irvine, CA 92697-2525
Phone: 949-824-5183
Email: pabowler@uci.edu

Students give highest marks to Bowler — for third time

The quality of Peter Bowler’s teaching at UC Irvine and the impact he has on his students are reflected in his recent selection as Outstanding Professor in Biological Sciences. The student-conferred award, presented by the Associated Students of UCI, marks the third time Bowler has been so honored. He also received this award in 1997 and 2001.

Jenny Liou, a junior who has taken a number of Bowler’s courses, expresses the view of many students. “He’s an excellent scientist, but he also cares so much about teaching,” says Liou, who is currently conducting independent research with Bowler. “It’s an honor to work with him, but he’s a friend as well. He’s always approachable and has a lot of respect for students.”

Albert Bennett, chair of the Department of Ecology and Evolutionary Biology, understands the students’ enthusiasm. He says, “Peter is a natural teacher. His enthusiasm just bubbles over, and you have to get interested in what he’s talking about because he’s so interested in it.”

Bennett is also impressed by Bowler’s dedication to students: “He always does more than his fair share of teaching, because he really thinks it’s important that the classes get taught and taught well. We’re very lucky to have him in our department.”

“The award means a lot to me,” Bowler says, “because it comes from the students. Teaching is an interactive, dynamic process that goes far beyond simply ‘telling’ students something. True teaching turns a topic around like a jewel, looking at it from many perspectives, including those contributed by the students themselves.”

Bowler, who has been teaching at UC Irvine since 1979, is passionate about his chosen career. “Quite honestly, for me teaching is a way of life — my way of life — to which I will always be married, and I am certain it will continue to fulfill me. Education is never completed, as my student friends and colleagues teach me every day.” — *JB*

NRS founder's UCSC field quarter has taught new ways of seeing to two generations of students

Each spring quarter for the last 30 years, the UC Santa Cruz Spring Natural History Field Quarter class has set off on a tour that transforms the students. Their objective is to view the state's natural environments from a new perspective, and their classroom is the Natural Reserve System.

The exact itinerary of the field quarter changes from year to year. Recent destinations included Sweeney Granite Mountains Desert Research Center in the Mojave Desert, Santa Cruz Island Reserve in the Channel Islands off the coast of Santa Barbara, Landels-Hill Big Creek Reserve on the Big Sur Coast, Angelo Reserve in Mendocino County, and Sierra Nevada Aquatic Research Laboratory (SNARL) near Mono Lake.* The goal, however, is always the same: to totally immerse field quarter participants in the study of California's spectacular natural history.

**Landels-Hill Big Creek Reserve and Angelo Reserve are protected by The Nature Conservancy (TNC). Santa Cruz Island Reserve is protected, owned, and managed by TNC.*

More than 700 students have taken the course over the years. They don't travel with transect lines and laptops. Their tools are those of the naturalist — binoculars and field manuals, good boots and keen eyesight. For ten weeks, students slow down, clear their minds, and train themselves to observe nature's patterns with a discriminating eye.

During the field quarter as conceived by NRS founder Ken Norris, the class travels together — originally in an old blue bus equipped with a loudspeaker for on-the-go presentations — totally removed from the usual distractions of daily life. The program has had an impact far greater than anyone could have imagined. As Norris explained in his oral history:

*[O]ur little moving organism across the state became an organism into itself and it was terribly different than teaching in a laboratory or a lecture hall... I was dealing with the lives of 23 young people, all bright, all special in their own ways, who were busy trying to find their place in the world. I was part of it. I wasn't just on the sidelines. I was part of that search, and it marked me for life. [From: Kenneth S. Norris / *Naturalist, Cetology, & Conservationist 1924-1998 / An Oral History Biography*; Randall Jarrell and Irene Reti, interviewers; Randall Jarrell, editor; Regional History Project, University Library, UC Santa Cruz, 1999; pp. 44 and 48.]*



NRS founder Ken Norris with his field quarter students in the mid-1980s. Photo by Don Usner

gist, & Conservationist 1924-1998 / An Oral History Biography; Randall Jarrell and Irene Reti, interviewers; Randall Jarrell, editor; Regional History Project, University Library, UC Santa Cruz, 1999; pp. 44 and 48.]

Today Steve Gliessman, who was Norris's co-teacher for many years, and Breck Tyler, who began as a teaching assistant in 1991, carry on the field quarter tradition. The old blue bus has been retired, and budget concessions

Continued on page 10



(Left) Ken Norris examines a snake with his field quarter students. Photo by Kevin Kilpatrick (right) The Big Blue Bus — “Old Blue” — stopped at Kelso Dunes, near the Sweeney Granite Mountains Desert Research Center, Field Quarter 1984. Photo by Steve Gliessman

NRS founder's field quarter

Continued from page 9

dictate that the course be offered every other year by the Sierra Institute, part of UCSC Extension, but the essence of the course remains constant.

Gliessman says: “We put people in the field for an extended time, and they’re able to disconnect from the daily pressures of life. By disconnecting and immersing themselves into a natural environment, they begin to slow down and take note of the environment in ways they just can’t do otherwise.”

Tyler now leads the program for the Sierra Institute, and he puts it this way: “The students have one job to do — to learn about nature. And they get into that mode. We do natural history when we get up in the morning, we do it all day long, and we’re still doing it at ten that night. And the students think that’s just great. They turn off the filters and open themselves up to learning. They learn to take the time to understand what an organism is telling them.”

Over the years, the instructors have built and refined a very effective curriculum. “We have a sequence of activities, a sequence of sites that works very well,” Gliessman notes. “Even if we go to the same places, every year is different just naturally — wet years, dry years, hot years, cold years.”

Tyler stresses the importance of the reserves and of enabling students to experience the natural environment directly. “Every site we visit is unique and filled with interesting things to observe. These students are bright, but they have very little field experience. They’ve mostly been in classrooms studying policy or theory. Now they get to actually do science, and every bit of success they experience really encourages them. They realize they can figure things out.”



Steve Gliessman carries on the UCSC field quarter tradition — (above) lecturing on California flora at Norris Camp, Sweeney Granite Mountains Desert Research Center, and (below) making field observations in a moist canyon on Santa Cruz Island’s north side during a scouting trip for the interpretive trail between Prisoners’ Harbor and Pelican Bay. Photos by Breck Tyler



The tour always begins in the secluded deserts of southern California. “The Mojave Desert and Sweeney Granite Mountains Reserve work well as a beginning,” Gliessman explains. “It’s kind of the shakedown trip where the group gets to know itself, gets to form its own identity. There’s something about the psychology of learning in a group and experiencing things together that works really well. The desert is ideal because patterns are more distinct; vegetation

is not as diverse or complex. It’s a good place to initiate the process of natural history observation, the use of the tools, and getting everyone comfortable with nature’s pace. They learn to get a sense of place and begin the development of their natural history field journals.”

The field journals are a key to the course’s success. Students build them throughout the quarter, aided by regular readings and feedback from the instructors. “They are a great tool,” Tyler agrees, “because they force students to slow down and really observe. Learning to balance watching and recording is an art, but they get it with practice. We want them to record what they’re seeing right there, because if they wait until the end of the day, then it’s really not recording any more, it’s remembering, and memory can filter things. We want them to capture nature as it’s happening.”

After returning from the desert, the group is home only a few days to do their laundry and prepare for the next trip. Soon they’re back on the road, heading for the NRS’s field station on Santa Cruz Island. “At the island, we’re ready to ask different kinds of questions,” Gliessman says. “Ecologically, the island is different with a lot of issues around isolation, endemism, management, all ... within a very unique history.”

The activities here build on the observation skills first learned in the desert. Tyler explains: “The students now find themselves in a completely new system. All the plants are different, but some might be related to those they saw in the desert. So we challenge them, ‘Can you determine what family it might belong to or what kind of community this is?’”

After an extended stay on Santa Cruz Island, there’s time for a short stay of three to four days at the Landels-Hill Big Creek Reserve to familiarize the group with another, very different land-

scape. Part of this visit to the Big Sur coast is designed to set students up for their next, extended trip to the Angelo Reserve on the Mendocino coast.

“Angelo and Big Creek are so different,” Gliessman explains. “They’re both on the coast, and they both have a mountain/stream relationship, but ecologically they’re very different. At Big Creek, you have chaparral with patches of redwoods and a few Santa Lucia firs, while up at Angelo, you have true forested landscape.”

Among Angelo’s giant Douglas firs, students are challenged to broaden their perspective and interpret the history of the landscape. Tyler says, “At Angelo, we try to look at things on a larger scale, from a forest perspective. We walk through the forest and ask the students to characterize a stand of trees or observe how the forest changes from area to area. What accounts for these changes?”

“We can really study a forest recovering from disturbance,” Gliessman adds. “We ask them to try to interpret the history of a place, whether it’s been cut or not, what’s affected it since then, and how long ago that might have been. How much is human influence versus natural change and processes? We also spend some time mucking around in the streams to get a feel for stream ecology and natural history observation at that level.”

Students are now ready for a major test of their observation skills. “We call it the Niche Hunt,” Tyler explains. “They pick an organism and spend a full day (12 to 14 hours) alone with it. Whether it’s a spider, a flowering shrub, or a tree, they settle in and spend time with it. What’s going on with its neighbors? What does it look like from different perspectives? What happens in the heat of the day? Niche involves time and space, so how might the organism



Field quarter students sampling long-term fennel management plots on Santa Cruz Island. Photo by Steve Gliessman



Field quarter students closely observing (from top to bottom) lizards in the granite Mountains, hedgehog cactus in the Granite Mountains, and a desert tortoise near Kelso Dunes. Photos by Steve Gliessman

change over time? What happens at sunrise or sunset? By slowing down and staying in one place, a lot of serendipitous things happen as well. A river otter might swim by or a mountain lion might appear.”

The final big trip takes students up into the Sierra Nevada, where they may spend some time at the NRS’s Sierra Nevada Aquatic Research Laboratory (SNARL) or in the White Mountains. The quarter ends on private property overlooking Mono Lake. “Dechambeau Creek is a beautiful little aspen-lined stream coming down out of the sagebrush with meadows on each side,” Gliessman says. “This is the site where the Mono Lake Committee started, so we acquaint students with the struggle to save the lake. We complete our field quarter there with the majesty of the Mono basin spread out below us. That stresses how important it is to connect with nature in order to protect it into the future.”

Both Gliessman and Tyler describe their work teaching the field quarter with an enthusiasm that’s contagious. “People come out really motivated in lots of different ways,” says Gliessman. “There’s a powerful part of field quarter that makes them all naturalists, no matter what walk of life they enter in the future. Some choose to go into it head on and become involved in conservation projects or policies. Others just carry it with them into whatever career they choose. But the course changes the way they treat nature. It’s wonderful to see. It’s one of those transformational experiences that really works.” — JB

For more information, contact:

Stephen R. Gliessman
Environmental Studies
University of California
Santa Cruz, CA 95064
Phone: 831-459-4051
Email: gliess@ucsc.edu

Kids in Nature trains the next generation of earth's caretakers at Sedgwick Reserve

Jennifer Thorsch is not your typical museum curator. An adjunct professor in UC Santa Barbara's Department of Ecology, Evolution, and Marine Biology, Thorsch is also in charge of the Cheadle and Esau Botanical Collection at the Museum of Systematics and Ecology (MSE) on campus. The collection represents over seventy years of work by two pioneering botanists, Vernon I. Cheadle (former chancellor at UCSB) and Katherine Esau (long-time professor at UC Davis and UCSB). And while most curators are content simply to organize and catalog their collections for researchers, Thorsch had other ideas: "This is a phenomenal collection, with biological specimens from throughout the world. But I realized that, if I didn't do something with the collection, it might simply collect dust and, with space so limited at the University, my last job might be carrying it all to the dumpster."

Her solution to this quandary might make many curators shudder: she teamed with the staff at the NRS's nearby Sedgwick Reserve to develop a program that opens up both the botanical collection and the reserve to hundreds of primary school students. With funding from a UC Faculty Outreach Grant and other private community foundations, Thorsch and her colleagues developed *Kids in Nature*, a highly successful program now in its second year. During its first year, 235 children from eight elementary schools, grades 4 through 6, made regular visits to the reserve and the MSE to learn about native plants.

Students were selected from school districts identified by the University as underperforming and underrepresented. "These were kids from families whose parents usually didn't have a secondary education," explains Thorsch. "One class was 70 percent English-language learners, but we found that the students did extremely well because our program was learning-by-doing rather than teaching-by-telling. We broke the language barrier down rather effectively."

The program is based on the idea that the best way to get kids interested in science is to give them a meaningful project. Michael Williams, director of the Sedgwick Reserve,



Fifth-grader Isabel Castillo works with Sedgwick docent Elizabeth Quick to plant a native perennial grass in the reserve's restoration area. Photo by Jennifer Thorsch

had a challenging assignment — restoring native plants on the reserve. "Mike did a great job by giving us an authentic project," Thorsch recalls. "He didn't select some waste piece of land for the students. He really put a lot of thought into where they should work. He wanted to make it a significant and important restoration area, so that students could come back years later and see what their project did to enhance the environment at Sedgwick."

Thorsch sees the Sedgwick Reserve and the Cheadle-Esau Botanical Collection as perfect complements for learning, even by very young students. "There's a continuum that the students need to understand to be able to grasp the whole picture," she explains. "By working in the museum and in the field, students make a connection between restoring natural areas at an ecosystem level and the importance of collections at the microscopic or structural level."

In October, each elementary school class came to the Santa Barbara campus and spent a day carrying out a series of activities in the collections and laboratories at the MSE and University. Thorsch and her University students designed the day to be more than a series of lectures. She said, "There were hands-on activities and experiments — studying specimens, using university microscopes to look at cells, creating slides — as well as art and technology components.

Fortunately, we had three to four Sedgwick docents there to help with each class. The docents were great because they knew the kids, and they could make sure that the microscopes were handled carefully and there were no problems with sharp tools the students used for their experiments.”

Thorsch gives the Sedgwick docents tremendous credit for the program's success. “Nancy Emerson and her docents were really the glue that held the program together,” she explains. “Without them the program wouldn't be one-tenth of what it is. They are the most incredibly dedicated group. Each docent stayed with a group for the entire year, so they formed relationships. They had to be there [at Sedgwick] each morning at the crack of dawn, getting things ready. And when the bus pulled up at the reserve, the kids would run to their docent, yelling their name, giving them a big hug, updating them on what's happening in their lives.”

In all, the students made five trips to the reserve throughout the school year. During their first visit, they became familiar with the reserve's flora and fauna, as well as the tools they would be using. On their second visit, they set to work. Under docent supervision, each group of five to six students selected a 25-square-meter plot and began investigating which plants were appropriate in that location. A small, native plant nursery at the reserve, developed by docents, provided all of the plants the students would need.

During subsequent visits, the students and docents worked on their plots — watering and caring for the plants, measuring and noting plant growth, doing additional plantings, and weeding out invasive species. They thoroughly documented all changes in logbooks that included careful mea-



Katie Nelson (foreground) and Isabel Li, two fourth-graders from Los Berros School, Lompoc, are sharing a microscope and examining onion cells. Photo by Jennifer Thorsch

surements, digital photography, and drawings. Some students even did preparatory work for future restoration projects, identifying native plants, collecting seeds or making cuttings, and planting them in the nursery. “As a group, the kids were so respectful,” Thorsch recalls. “The docents trained them in how to use the shovels and picks, and we didn't have one injury.”

The children's teachers made sure that, back in their classrooms, the program continued. Under Thorsch's direction, University students at UC Santa Barbara had designed classroom activities to teach the elementary school students more about plants. They had even developed two computer simulation games. One of these, which they called “The Plant Restoration Ecology Game,” challenged the children to develop and maintain a plot of native California plants like those they found at Sedgwick — valley oaks, purple sage, sycamore, and coast live oaks. Lessons learned from playing the simulation proved invaluable when the children returned to the reserve.

The high point of the first year came in May 2002 when everyone gathered at Sedgwick for a Celebration Day to present the results of their efforts. Using the data they had collected throughout the year, each group created a poster that outlined how different plants had fared in their plots, and offered reasons to explain these outcomes. Each poster featured student writing, photography, artwork, and graphs of plant growth. Thorsch praised their work: “It was really amazing that these fourth-, fifth-, and sixth-graders could create such phenomenal posters. One class even did PowerPoint presentations of their work!”



A student inks the underside of a sycamore leaf with a colored marker. The inked leaf is then pressed onto paper to make a print. Students at Sedgwick Reserve use leaf prints to help them identify different plant species. Photo by Jennifer Thorsch

Continued on page 14

Kids in Nature

Continued from page 13



In the laboratory at UCSB, students work with docents, graduate students, and teachers

to investigate plant cell structure, to dissect flowers and identify their parts, and to prepare nature prints from leaves of native species collected at Sedgwick Reserve. Photos by Jennifer Thorsch

For more information, contact:

Jennifer Thorsch

Cheadle and Esau Botanical Collection

— and —

Ecology, Evolution, and Marine Biology

University of California

Santa Barbara, CA 93106

Phone: 805-893-2401

Email: thorsch@lifesci.ucsb.edu

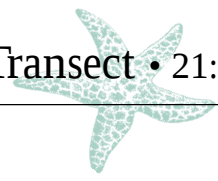
Website: http://lifesci.ucsb.edu/~mseweb/cheadle_esau/index.html

The program is now into its second (and final) year of funding. The Faculty Outreach Grants Initiative has partially funded *Kids in Nature* for a third year, but more is needed to fully implement the program. Thorsch remains enthusiastic. She's already strategizing how to expand the program in future years. Her vision might include other local NRS reserves. "If we could link Carpinteria Marsh, Coal Oil Point, Sedgwick, and the Museum of Systematics and Ecology," she said, "we could put together a phenomenal program. It would take a lot of planning and a funding agency that shares our vision, but who knows?"

For Thorsch, the outcome of education programs like *Kids in Nature* is critical. "People need to understand plants and the environment if they're going to protect our environment and make things more sustainable in the future. Without that basic understanding, these children won't be able to make good decisions when they grow up." — JB



On Celebration Day, two fifth-graders from Arellanes School, Santa Maria, proudly display the poster and a printout of the PowerPoint presentation they prepared on their research and restoration work at Sedgwick Reserve. Photo by Jennifer Thorsch



A few words

Continued from page 1

eighteen and older, the first question asked for a definition of a watershed. The total of correct answers was 41 percent. Of those polled who had a college or higher education, 60 percent answered correctly. Anecdotally, the then-U.S. president's spouse "did think that a watershed was a building on the water treatment plant site" (see: <http://www.enviroliteracy.org/article.php/449.html>). Only 9 percent of the respondents knew that water-borne diseases were the leading cause of childhood death worldwide.

University students share the general population's limited environmental literacy, prior to their enrollment in courses in environmental sciences. UCLA's Hartmut Walter says of his students, mostly seniors: "Our students may learn a basic knowledge of nature as youngsters, but they lose it as teenagers. So when we get them at 20 or 21, they don't know anything anymore. They don't know what an oak tree looks like. They can't identify a pine." UCI's Peter Bowler observes, "Our students have mostly led an urban life. They don't have a sense of geologic place or a natural history identity."

Field courses do much more than just familiarize students with the elements of natural environments. The lead article in this *Transect* describes how Walter's course, *Field Analysis: Biogeography*, gives students hands-on experience with the complexities of field research. They learn how to identify environmental problems and how to arrive at potential solutions. Meanwhile, Bowler's undergraduate students work on restoration projects and measure various ecosystem functions (page 7).

Imparting environmental literacy is challenge enough, but the nature and culture major at UC Davis goes far be-

yond this goal in addressing the question, "Where do humans fit in nature?" (page 4). A core course takes students to the McLaughlin Reserve to "examine the scientific and literary/artistic approaches to the study of nature and culture in a single place." UCD's David Robertson "wants the students to realize that science and the humanities are really parts of one joint enterprise: the ongoing effort of human beings to understand themselves and their world."

The sharply contrasting environments of multiple NRS reserves provide irreplaceable study opportunities for upper division undergraduate students enrolled in UCSC's unique Natural History Field Quarter (page 9). Initiated over 30 years ago, the field quarter was an inspired creation of NRS founder Ken Norris. For many years, field quarter instructors Steve Gliessman and Brett Tyler have been bringing a unique blend of experience and institutional memory to their teaching. The field quarter now consists of three comprehensive, interrelated courses: (1) a field survey of the natural history of California species and ecosystems, (2) a field survey of the flora of California, and (3) a field survey of land-management history, strategies, and contemporary problems in the protection of California's natural landscapes. Students spend over 40 days in the field and three to four weeks attending formal lectures at the Santa Cruz campus.

Finally, the story of Jennifer Thorsch's *Kids in Nature* program (page 12) for children, grades 4 through 6, is an inspirational tribute to Professor Thorsch's dedication and skills and to the achievements of these young children.

— Alexander N. Glazer

Director, Natural Reserve System

Natural Reserve System

Future in doubt at Sierra Institute

Sierra Institute, 2003 host for UC Santa Cruz's Natural History Field Quarter (see story page 9) and the sponsor of numerous other field courses, faces an uncertain future. UCSC Extension, the program's home for decades, is closing down the institute this June due to budget deficits.

Sierra Institute director Ed Grumbine is working hard to find a new home. "Students love our courses," he says. "Our classes were 96 percent full this year, and we always turn a small profit. But Extension needs us to generate much larger profits to cover overhead."

Grumbine views the institute's expulsion from Extension as part of a larger national trend. "The God of Efficiency is pressuring field programs at universities everywhere. A professor can reach hundreds of students a day lecturing in a classroom, where we only take twelve or thirteen into the wilderness for eight weeks."

Steve Gliessman, UCSC environmental studies professor, who alternates with instructor Breck Tyler to lead the field quarter every other year, greatly regrets the loss of the Sierra Institute to UCSC students: "[Sierra Institute] provided a wonderful model for field classes all over the country. UCSC's environmental studies department counts so much on the field study experiences they provide for our students."

Grumbine is currently negotiating to keep the program alive at another UC campus. For more information about the Sierra Institute, go to: <http://www.ucsc-extension.edu/sierra/index.html>. — JB

State of California honors regional conservation partnership

NRS reserves play key roles in bioregional planning groups in many parts of California. One such group, the Blue Ridge/Berryessa Natural Area (BRBNA) Conservation Partnership, has received the state's most prestigious environmental honor: the Governor's Environmental and Economic Leadership Award. This award, made through a program administered by the California Environmental Protection Agency, was established in 1993 to honor "excellence in protecting the environment and conserving natural resources, while promoting compatible, sustainable economic development."

The BRBNA partnership was honored as a model for watershed management and was credited with the "conservation, preservation, and management of over 500,000 acres of natural, wild, agricultural, and recreational lands located in the upper Cache and Putah Creek watersheds of Solano, Napa, Yolo, Colusa, and Lake Counties."

Established in 1997, the BRBNA partnership is a voluntary group of 40 partners, including private landowners,

state, county, and federal agencies, non-profit organizations, and three NRS Reserves — McLaughlin Natural Reserve, Quail Ridge Reserve, and Stebbins Cold Canyon Reserve. All three reserves are administered through UC Davis, and a number of UCD faculty and staff are actively involved in the partnership. Virginia "Shorty" Boucher, manager for several UCD-administered NRS reserves, finds the effort rewarding: "The BRBNA gives us an opportunity to interact face to face with a wide range of agencies and organizations, so it's a good way to stay up with environmental issues in the area. The group has also provided invaluable support for recent land acquisitions and grant applications. In turn, UC serves as a valuable repository for environmental information and expertise that is invaluable to the partnership." — *JB*

For more information, contact:

Virginia "Shorty" Boucher
Reserver Manager / UC Davis NRS
DESP - 2112 Wickson Hall
University of California
Davis, CA 95616
Phone: 530-752-6949
Email: vlboucher@ucdavis.edu

Transect

Spring 2003 • 21:1

Transect is published triannually by the Natural Reserve System (NRS), part of the division of Agriculture and Natural Resources (ANR), in the University of California Office of the President (UCOP).

Subscriptions are free, available upon request. Contact: *Transect* Editor, Natural Reserve System, University of California, 1111 Franklin Street, 6th Floor, Oakland, CA 94607-5200; phone: 510-987-0150; fax: 510-763-2971; e-mail: clarina.quan@ucop.edu.

Recent *Transect* issues are also available for viewing on the World Wide Web at: <http://nrs.ucop.edu>. Subscription requests can also be made via this NRS website.

Managing Editor:

Susan Gee Rumsey

Senior Science Writer:

Jerry Booth

Copy Editor: Linda Jay Geldens

Circulation: Clarina Quan

Web Mistress: Cyndi Lukk



Recycled paper printed
with soy-based inks

The University of California prohibits discrimination against or harassment of any person employed by or seeking employment with the University on the basis of race, color, national origin, religion, sex, physical or mental disability, medical condition (cancer-related), ancestry, marital status, age, sexual orientation, citizenship, or status as a Vietnam-era or special disabled veteran. The University of California is an affirmative action/equal opportunity employer. The University undertakes affirmative action to assure equal employment opportunity for underutilized minorities and women, for persons with disabilities, and for Vietnam-era veterans and special disabled veterans. University policy is intended to be consistent with the provisions of applicable state and federal law. Inquiries regarding the University's equal employment opportunity policies may be directed to: Office of Affirmative Action/Staff Personnel Services, University of California, Agriculture and Natural Resources, 300 Lakeside Drive, 6th Floor, Oakland, CA 94612-3560; phone: 510-987-0096.

0460

Natural Reserve System
University of California
1111 Franklin Street, 6th Floor
Oakland, CA 94607-5200

Nonprofit Org.
U.S. Postage
PAID
University of
California