



The Science *of* Change

New Department Seeks Research-Based Solutions To Real-World Problems

By Stephanie Jeter '06

It takes work to be the best.

You have to be stronger, faster and made of flexible steel to lead in the field of education. It's more than academia. Education has a way of jumping lanes, taking research to industry and then translating that industry to the world.

A recent merger in the College of Agriculture and Life Sciences is proving that by being open to change, a department can fill the void in both places. Because for as long as ecosystems require awareness, Texas A&M's Department of Ecosystem Science and Management will be there to lead and inform.







The third floor of the west campus Horticulture Building is home to a jumble of sciences. There are cacti in a lab off the hallway undergoing experiments to make them easier to eat. Parked outside an office door, there's something that looks like a high-tech lawnmower on three wheels. Instead of whirling blades, the contraption sends and receives radio signals to show what's in the soil. A classroom downstairs is teaching rangeland and forest management principles.

The impressive mixture is a new concoction in teaching and science, said Dr. Steven Whisenant, department head of Texas A&M's Department of Ecosystem Science and Management.

It's hands-on learning, analytical-based teaching that's proving a wide-reaching result. Born out of an experiment ripe with uncontrollable variables, what emerged is an ecological story-tale.

Starting At The Beginning

Once upon a time, the department on west campus was a come-one, come-all blend of range and forestry. The department went by one name—Rangeland and Forestry—and it stayed that way from 1946 to 1969. Soon, though, “the two split off,” Whisenant said. As two separate departments, they each pursued their own agendas for 38 years, focusing on and developing rangeland and forestry as different disciplines.

Time ticked by. “The world changed a lot during that 38-year trial separation,” Whisenant said. Time always brings two

characters together in a story, and slowly through the decades, the environment became something more to protect.

During that time, social, environmental and scientific changes emerged naturally to again pair rangeland and forestry.

The two departments—Rangeland Ecology and Management, and Forest Science—had more in common than they realized. So much so that in March 2007, the two became one once again.

“But rather than call it rangeland or forestry, and rather than make the department name both names like 60 years ago, we chose Ecosystem Science and Management,” Whisenant said.

It was a perfect union, he said. Strong in different ways, yet focused on the same thing. “There were far more similarities in the goals and objectives of the two departments than differences,” he said.

Plus, together, they could extend that collaboration of ideas to research, teaching and extension programs. Together they would join more faculty members to translate the research data to solve real problems.

The ultimate departmental marriage; they sealed it with a shared letterhead.

Degrees Offered

The Department of Ecosystem Science and Management offers degrees in:

- Rangeland Ecology and Management
- Forestry
- Renewable Natural Resources
- Spatial Sciences
- Ecological Restoration

A New Department

“We're a very diverse department as far as the kinds of people we have,” Whisenant said. “It's not just rangeland and forest. We have geneticists, ecologists, eco-hydrologists, restoration ecologists and social scientists that study policy and the human decision making process. We have scientists who work with endangered species and invasive species. We have those who work on aspects of global-change ecology. We have scientists who work with spatial sciences—things like geographic information systems, landscape ecology and remote sensing. And we have people who work on different kinds of land management.”

Ecosystem Science and Management has a lot.

As a result, Ecosystem Science and Management impacts a lot because the next step this newly unified department took propelled Texas A&M in a hundred different directions. The next step took the findings to the world.

There are more examples of the department going outward with its research

Graduate students collect soil samples at the department's La Copita Ranch near Alice, Texas.



PHOTO BY TOM BOUTTON



(Left) Graduate student Tony Ku, Dr. Robert Washington-Allen and Dr. Sorin Popescu prepare to do a three-dimensional laser scan in a rainfall exclusion shelter.

(Below) Savanna ecosystems are expected to be impacted due to future global change. Just how much impact is studied by using rainfall exclusion shelters.



PHOTO BY MARK TJOELKER

than the cactus in the lab has spines. Assistant Professor Dr. Robert Washington-Allen's office is on the third floor with the lab, but you can't keep his work in one place. His computer takes him to spots like Afghanistan, Ethiopia and Mongolia to put information in the hands of nomadic pastoralists, or nomads who travel with the herds.

Using two sets of satellite-generated data, Washington-Allen revealed that scientists can pinpoint how much vegetation grows in certain areas. Find the areas with the most vegetation, he said, and put it on a weekly radio program, and these roaming agriculturalists can take their herds to the best grazing spots.

Word of mouth can certainly work to a point, but the program Washington-Allen helps to offer sends information directly to those who need it.

"We're in a world with more and more problems, and we have to solve these problems and come up with applications to do it," he said. "We do have people who are gung-ho about coming up with solutions to these things then actually coming up with applications."



PHOTO BY MIKE MESSINA

(Above) A portable gas analyzer is used to assess carbon uptake rates in several post oak seedlings.

(Left) Students participated in a prescribed burn at Jones State Forest to help maintain habitat for the red-cockaded woodpecker.

PHOTO BY MARK TJOELKER

The department doesn't just work internationally. The process of gathering information is easily altered and brought to the United States, he said. The same system of satellite weather data, satellite vegetation data and computer technologies are being mixed to help local ranchers and assist forage loss insurers.

The examples never end. Dr.

Mark Tjoelker, an associate professor of forest ecology, is working to understand the implications of future climate and weather conditions. With global warming now scientifically accepted, Tjoelker said, they want to know how native ecosystems will respond.

"The entire planet is a living, breathing organism," Tjoelker said. Change some-



PHOTO BY MIKE MESSINA

Departmental Definitions:

Ecosystem (ē'kō-sīs'təm) **noun:** a community of organisms together with its environment, functioning as an ecological unit. It's the trees and the soil, the rocks and minerals, plants and animals. It's a community of everything living and nonliving in an area.

Rangeland: (rānj-land) **noun:** land used or suitable for grazing livestock.

Forestry: (fôr'ti-strē) **noun:** the science of developing, caring for or cultivating forests, or the management of growing timber.

“This reorganization enriches our research programs by expanding our spatial and disciplinary scope and engaging a more diverse group of faculty. ... The department aspires to be a premier ecosystem science and management program that significantly impacts the science, education, and management affecting ecosystems.”

Dr. Steven Whisenant, head of the Department of Ecosystem Science and Management

thing, and the organism will be altered.

Using sheltered plots, Tjoelker can control the rainfall and temperature of a savanna ecosystem. The experiment continues. The result, he hopes, is to emerge with an idea of the future.

“It’s a really exciting opportunity,” he said. “Taking what we have and what former scientists have discovered—

throw it together and we can start to think creatively about the future.”

Another of Washington-Allen’s ventures offers market prices to nomadic pastoralists.

“This web collection shows individual market data,” Washington-Allen said. “The significance of this is, if you’re a pastoralist and you’re stuck out in the

middle of nowhere and you need to sell, that normally involves a middle-man telling you the market price.”

Being able to check market price ensures a fair price, he said. Scientists are working on making that service available by phone.

Then there’s the department’s focus on improving ecosystem management, Whisenant said. Once unheard of, community spotlights on environmental clue words like carbon footprinting, clean water practices, flood prevention and nutrient cycling are proving to be financially beneficial. “Our students manage or repair those damaged ecosystems to better serve the needs and goals of society,” he said.

Like most modern-day problems, Tjoelker said, remedies are complex and don’t come easily. The effective thing about the department is because of its diversity, “we have everyone needed to answer in one department,” he said. “It really is exciting to bring people together.”

A New Way Of Teaching

It’s revolutionary, Whisenant said. For so long, collegiate and scientific thinking has focused on definitions and stiff solutions. Not anymore. “We now bring cutting edge science to real-world problem solving,” Whisenant said. Similar problems don’t always share identical solutions, he explained. Every ecosystem is different and decisions are often made by groups instead of one person. “Students still learn

(Below) Dr. David Briske leads students in a field tour to explore the effects of global climate change in post oak savanna ecosystems.

(Right) Dr. Rusty Feagin teaches a class in geographic information systems for research management.



(Above) Students assess biodiversity in an old-growth forest in the Angelina National Forest.

(Left) Dr. Andrzej Jagodzinski measures light interception in a forest stand in Poland as part of an international collaborative research project with Texas A&M University.

forestry or range management and understand how natural systems operate, but we're incorporating collaborative decision-making skill into our education," he said.

Dr. Xinyuan Ben Wu, a professor in the department, has seen the change, and has even been part of it.

"The objective of the course has evolved over the years," Wu said. "Traditionally we focused on knowledge. We want them to have a general knowledge about what ecology is about, but over the years we've become more and more interested in inquiry and the student's ability to learn."

Because when students understand the process of generating knowledge, they can better solve problems. And when problems are solved better, the result is better.

"There's an increasing interest in the future," Wu said. People go out into nature and find pristine environments that they want to protect, "but we also want to improve what we already have," he said. "Ecological resources have become an emerging area."

Gone are the days of just describing problems in the environment,

Whisenant said. "We attract many students who really want to make a difference in the world. They want to be proactive and address those problems, make the world a better place."

Students who pass through the degree program are equipped with the tools needed to positively impact ecosystems. The department's vision of teaching science-based problem solving addresses real-world quandaries. Texas A&M has the expertise; it's the students who are taking it to the world through practice.

With knowledge from classroom and lab settings, students "will go out and be leaders in different fields," Wu said. "That's where education really works. You're doing something where a light sparks. That's what lasts. That's what will stick."

Leading In Education, Leading In Industry

The world is a little more complicated now, Whisenant said.

It's not just what you want to harvest from the land. "As we manage lands to get a product, we have opportunities and obligations," he said. There's always someone downstream.

"We have an obligation to our students and society to prepare them for the future," Whisenant said. He's pleased with what's happened so far.

After all the teaching and all the research hours, the question left is, has the department done it? Are they on the right track to really effect change?

"Oh, yes, without question," Whisenant said. "We are a leader in our field."

As the leader, Whisenant knows others are watching, "so we have a lot to do." 🌱

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OTTOM PHOTO BY MARK TJOELKER
CIRCLE PHOTO BY MARK TJOELKER