In the summer of 2011, Erik Nielsen, SESES Associate Professor, arrived in the Rio Platano Biosphere Reserve located in the La Mosquitia, or the Mosquito Coast, region of Honduras. He had been working in this region for over 15 years engaged as a conservationist and researcher but he was unprepared for the levels of deforestation and social conflict he encountered. As he and his graduate student, MS ES&P Spencer Plumb (2011), investigated the underlying social and economic drivers of this recent deforestation, they discovered that it was linked to the recent arrival of cocaine trafficking in the region.

Nielsen and Plumb documented that narco-trafficking organizations had shifted their activities to this remote region in response to international drug interdiction efforts, and the impact on the indigenous communities and forests was devastating. First, narco-traffickers were clearing large swaths of the forests for clandestine landing strips. The foreign traffickers were displacing indigenous communities and agricultural activities, undermining local forest governance, and corrupting local officials through violence and intimidation. In addition, traffickers were laundering illicit proceeds into legitimate cattle ranching activities as well as illegal timber trafficking, further intensifying deforestation pressures.

When they returned from 2 months in the field, Nielsen and Plumb immediately began working with Ophelia Wang in NAU’s Lab of Conservation Biology and Landscape Ecology to use remote sensing analysis to quantify the rates and patterns of deforestation resulting from these underlying drivers. Dr. Nielsen also began to share these findings with geography colleagues working with indigenous communities throughout Honduran and Guatemalan protected areas of the MesoAmerican Biological Corridor. They too had noted similar dynamics through different lines of inquiry and soon they began to synthesize their findings on narco-deforestation, resulting in three articles including one in the journal *Science*.

This publication received widespread coverage in the global media including *Le Monde*, the *New York Times*, *BBC News*, *The Guardian*, *National Public Radio*, *Al Jazeera-America*, and the *Christian Science Monitor*.

The research team continues to build on this initial research. For example they are working to model and quantify the deforestation patterns of narco-trafficking across Central American protected areas in response to trafficking movements documented by military surveillance.

While Nielsen acknowledges that he and his colleagues are not drug policy experts, they have discussed their findings with key UN drug officials and hope that conservation remains on the agenda as the US and international community explore alternatives to the oft-criticized war on drugs.
From the Director’s Desk

Welcome to the premier issue of the Fall 2014 NAU Environmental Programs newsletter! As the Director of SESES, I am happy to report that the School has become one of the most successful units at NAU, and the Environmental Programs students and faculty are a critical part of that success. Two of the major reasons for that success are the well-funded research conducted by our Environmental faculty, and the regular involvement of our undergraduate and graduate students in that research.

Here are a few of the many highlights of our Environmental programs. First, our School is becoming more integrated, which produces important connections and synergies. One example is the growing relation between our young MS Climate Science and Solutions program and our MS Environmental Sciences and Policy program. Second, we are hiring more Lecturers with PhD degrees who are regular faculty in our School. These new faculty are working to grow our introductory ENV101 course, which adds teaching assistants for our graduate students; the lecturers are also helping us teach some of our key majors classes. Third, our professors are obtaining research funding at a high level, which is allowing students and faculty to conduct cutting-edge research in the Southwest and around the world on environmental problems important to society. One example is Associate Professor Erik Nielsen, whose research in Central America resulted in a paper in Science this past year, and is featured here as our cover story. Finally, I want to emphasize that we are serious about growing our alumni relations in our Environmental Programs, and we hope you can get involved!

Paul Umhoefer, Director, paul.umhoefer@nau.edu
School of Earth Sciences & Environmental Sustainability (SESES)

From the Associate Director’s Desk

Dear Friends,

It is with great pleasure that I greet you all via our first-ever Environmental Programs newsletter. Thank you to Amy Wolkowinsky, our Outreach Coordinator, for leading the effort to get a newsletter up and running. We as faculty and staff look forward to finding out what you are doing these days, and we have lots of news that we would like to share.

When I was hired at NAU in Fall 1998, our unit was known as the Center for Environmental Science and Education (CESE), with a single and very active undergraduate degree program in Environmental Sciences. Due to your infusion of enthusiasm and talent, coupled with your engagement and strong commitment to the environment, the Environmental Programs faculty and staff continue to be energized daily. We have consequently grown several new interdisciplinary degree programs. The year 2014 finds us now hosting four degree plans; the Environmental Sciences BS degree, the Environmental Studies BA/BS degrees, the Climate Science & Solutions MS program, and the Environmental Sciences & Policy MS program. Our degree-seeking Environmental Programs students now number well over 300, and we are still growing. Of all the science units across campus, we are now exceeded only by the Department of Biological Sciences in the number of majors and rate of our growth.

We have great positive momentum. The Environmental Programs faculty and staff continue to develop and maintain rigorous interdisciplinary programs designed to prepare graduates to address pressing and complex environmental issues. And new degree plan opportunities are continuing to emerge. The Environmental Studies BA/BS degree–Juris Doctor 3+3 degree plan, offered in conjunction the University of Arizona James E. Rogers College of Law, was just approved last month and should soon appear in the NAU Academic Catalog.

Well, that’s a brief update on us. Now it’s your turn. We look forward to learning about your path since your graduation from the Environmental Programs. Please stay in touch.

All the best,
Diana Elder, Associate Director
School of Earth Sciences and Environmental Sustainability

Recently Hired

Nick McKay
Assistant Professor
B.S. 2005, Env. Science & Geology, NAU
M.S. 2007, Geology, NAU
Ph.D. 2012, Geosciences, University of Arizona
Research Interests: continental-scale temperature variability during the past two millennia, West African climate variability in the past one million years, Late Holocene climate and glacier variability in the arctic.

Mike Smith
Assistant Professor
B.A. 1999, Geology, Carleton College, Northfield, MN
M.S. 2002, Geology, University of Wisconsin-Madison
Ph.D. 2007, Geology, University of Wisconsin-Madison
Research Interests: Investigating the terrestrial expression of climate changes using lacustrine sedimentary strata deposited during high-pCO2 climates, tectonic and landscape processes as recorded in tectonically-formed lacustrine and marine sedimentary basins, and Cenozoic stratigraphy of terrestrial basins in the Laramide foreland region and Cordillera.
Giving to NAU Environmental Programs

State-supported institutions of higher learning are becoming increasingly dependent on donor support due to budget shortfalls in most states. If you give a gift to one of the funds listed below, all of it will go to support NAU Environmental Programs.

- **Conservation Science Gift Fund** – This fund is used for student research in conservation science, fostering student involvement in applied conservation activities, public outreach and policy work, and student travel to professional meetings/other appropriate venues. Fund #4946

- **Environmental Science Scholarship** – Provides scholarships to environmental sciences students as decided by the Environmental Sciences Programs. Fund #4342

- **Environmental Sciences General Fund** – Discretionary money for the Environmental Sciences Programs. Can be spent on whatever is needed, including research and teaching equipment, salaries for students, professional travel, etc. Fund #4314

To make a donation using credit/debit, please call 928-523-6755 weekdays from 8 am – 5 pm MST. To donate by mail, send a check payable to the NAU Foundation and indicate the specific fund in the memo section of the check.

Environmental Programs Links

- **Undergraduate Programs**
  nau.edu/SESES-Ugrads

- **Graduate Programs**
  nau.edu/MS-ESP
  nau.edu/Climate
  nau.edu/SESES-PhD
Program Updates

Change has been in the air for the Environmental Sciences and Policy program (ES & P) for the last year, with more to come! I am serving as the Graduate Coordinator for the program, stepping in for Erik Nielsen for three years. For the 2013-2014 academic year, seven students joined the program, with an additional 11 students joining for the 2014-2015 cohort. The ENV faculty revised and updated the Program of Study, adding two new required courses (one on Regional Topics and another on Research Methods) and increasing the number of required thesis units to conform to university requirements. There are now two tracks within the program: a Paleoenvironmental Science emphasis, and a Science and Policy emphasis, and additional courses have been added to reflect changing faculty research interests across the curriculum. The program’s website has been updated, including links to our current ES & P students, information on alumni, and a FAQ section for prospective students.

Our alumni are perhaps the best spokespersons for the ES & P program, serving on our orientation panel each Fall, helping to recruit prospective students, serving as contacts for recent graduates and interns looking for positions in their field, and hopefully, contributing to our scholarship funds. Please consider giving back to NAU by making a contribution, perhaps in honor of a valuable faculty member, or just to thank the University for helping you along your current path. We value your contributions, financial or otherwise, to our programs!

Dr. Jacqueline Vaughn, Professor
Dept. of Politics and International Affairs
Graduate Coordinator
Environmental Sciences and Policy Program

ES & P Featured Alumni

Karin Wadsack
Project Director, Institute for Sustainable Energy Solutions
M.S., Environmental Sciences and Policy, Northern Arizona University, 2010
M.M.C., Journalism, Arizona State University, 1997
B.A., Government, College of William and Mary, 1995

Karin Wadsack directs the Arizona Wind for Schools project and manages a number of ISES research projects and administration. Her interests include utility-scale renewable energy grid integration, energy education, and state and federal energy policy. She is also project director for NAU’s Tribal Clean Energy Resource Center. Outside the University, Karin serves as a senior scientist and project manager at EN3 Professionals, an engineering firm in Flagstaff. She also chairs the energy project team for the regional Sustainable Economic Development Initiative and is a Water Commissioner for the City of Flagstaff. In her free time she enjoys mountain biking, rock climbing, snowboarding, and camping with her dogs.

Avi Henn
Sustainability Program Coordinator, Green NAU Energy Initiative
M.S., Climate Science and Solutions, Northern Arizona University, 2012
M.S., Environmental Sciences and Policy, Northern Arizona University, 2010
B.S., Conservation Biology and Conservation Social Science, University of Idaho, 2005

Avi Henn was born in a small town on the Mediterranean Sea in northern Israel. Growing up, Avi witnessed how uncontrolled industrial growth devastated the environment while providing only short-term economic benefits to the community. Avi realized that this was a global phenomenon, and became interested in global environmental and sustainability issues. While pursuing his undergraduate education, Avi held multiple research positions with a variety of federal, state, and private organizations. After graduation, Avi volunteered with Defenders of Wildlife, a national environmental group, and was hired to coordinate and direct the creation of the Conservation Registry, which is an online tracking system for conservation actions. During his master’s research at NAU, Avi created a protocol for evaluating the cumulative effects of multiple river restoration projects. Following his graduation, Avi worked with the Colorado Plateau Cooperative Ecosystem Study Unit, creating a database of river, stream, and riparian restoration projects. During pursuit of his second master’s at NAU, Avi helped lead a number of energy and utility conservation programs campus-wide. In January 2013, he began working at the Green NAU Energy Initiative as a program coordinator. Avi manages the Sustainable Behaviors program along with working on renewable energy development and waste minimization.

Kane Ranch, North Rim, Grand Canyon. The 2014 ES&P cohort joined returning students for a pre-semester weekend of hiking, campfire cooking, and star-gazing. This photo and cover photo taken by Ryan Lima.
What’s new with CSS?

As the CSS Program celebrates the arrival of our fifth cohort and thirteen new students in the fall of 2014, the program continues to expand and produce graduates in positions as diverse as Sustainability Manager for the City of Aspen and Business Program Specialist for Energy Efficiency for Hawaii Energy. With new courses in public discourse and career development, ninety percent of CSS graduates report using the skills they learned in the CSS Program in their jobs.

The program itself continues to grow with the guidance of Graduate Coordinator, Debbie Huntzinger, the Industry Advisory Board, the Graduate Committee and myself, the Career Coordinator for the program. The CSS program is one of just over 300 professional science masters programs in the United States that are helping to ensure their graduates are able to effectively integrate science into organizational settings.

As our program grows, alumni are playing a larger role in the program by providing informational interviews to current CSS students, assisting with placement in internships, and hosting greenhouse gas student projects in their businesses. We are deeply appreciative of the growing role of our alumni and are eager to engage you in our online presence, as well as these upcoming events over “Alumni Homecoming” October 16-17:

- Fifth Annual CSS Speaker Series featuring Klaus Lackner on October 16 at NAU; and
- Annual CSS Advisory Board meeting with mixer for the board, faculty, students and alumni on October 17 from 5:00-7:00 pm at the Lumberyard in Flagstaff.

We are also challenging our Alumni to submit photos of you in your work to me at holly.yeager@nau.edu. The photos will be used as we update our web site. We will select a winning photo that will be announced in the next issue of the newsletter.

Please continue to stay in touch and let me know if you ever need someone to review a cover letter or resume or help you to connect with our growing Industry Advisory Board. (http://nau.edu/climate)

Holly Yeager
Career Coordinator, Climate Science and Solutions

CSS Featured Alumnus

Chris Menges, Class of 2012
Data Research and Project Planner, City of Aspen

Chris works on the nationally-recognized Canary Initiative to assist the City of Aspen in reducing their greenhouse gases by 30% by 2020 and 80% by 2050 for both the city AND the community. This innovative project also includes the city’s adaptation and resiliency planning to address the many challenges of Climate Change.

Q: How did the CSS Program prepare you for your current position?

The CSS program provided a strong foundation in engineering, forestry, economics and climate science. With the CSS program, I was able to build on my background in climate and energy advocacy to address a myriad of factors that influence a community’s response to climate change. I also appreciated graduating with applied, marketable skills in greenhouse gas accounting, working with diverse audiences and summarizing complex policy issues to assist people in making informed decisions.

Find CSS on

CSS students at the People’s Climate March on Sept 5, 2014 in downtown Flagstaff, photo by Kaylee Beckman.
Transitions

Program Graduates, Fall 2013 and Spring 2014

Bachelor of Science

**Environmental Sciences**: Megan Burke, Keith Davis, Michael Marshall, Gregory Olson, Patricia Rees, Natalie Senini, and Kali Tegeler; **Environmental Studies**: Natalia Bergander, Lauren Betourne, Cody Buchanan, Julian Cashman, Sean Collins, Kevin Daniels, Elise Dillingham, Jacob Erickson, Mark Gallo, Candice Giffin, Robert Helmkamp II, Jonathan Himalaya, Kimberly Kliman, Madison Ledgerwood, Samantha Lockhart, Cara Macal, Alicia Madsen, Caryn Massey, Troy Meeker, Cedar Nicks, Brendan Pipkin, Diana Rosenblum, Nicholas Saffel, and Katie Stana; **Environmental Sciences – Administration & Policy**: Marcus Custodio, Joseph Jackson, Kelsey Morales, and Francine Popovich; **Environmental Sciences – Applied Geology**: Richard Crockett and Dion Obermeyer; **Environmental Sciences – Biology**: Carly Farr, Madeline Friend, Alec Mayes, Taylor Morganson, Sean Perks, Shane Pickett, Justin Pine, Alice Walker, and Gavin Walton; **Environmental Sciences – Communication**: Oliver Denny, Kyle McDermott, Frank Walter, and Olivia Peralta; **Environmental Sciences – Management**: Emma Hilliard, Brittany Larzalere, and Ryan Scott.

Bachelor of Arts

**Environmental Studies**: Kristen Beesley, Kristen Eckert, Jessica Green, Anna Kazakin, Olivia Peralta, Hannah Srogonick, and Allison Whiteford.

Master of Science

**Climate Science and Solutions**: Jason Bull, Carolyn Cooper, Kelly Engle, Julie Jurkowski, Nicholas Krause, Garrett Marcantel, Charles Pierre Sarr, and John Stellar; **Environmental Sciences & Policy**: Dominique Bain, Collin Haffey, Tanya Henderson, Lara Preteska, Cassandra Rivas, Whitney Rooney, Katie Sauerbrey, and Sasha Stortz.

Awards & Recognition

Undergraduate Awards

**Environmental Fund for Sustainable Futures Award**: Elena Greenberg
**Lisa Marie Jones Memorial Scholarship**: Emmett Tsosie
**Bill Morrall Conservation Scholarship**: Randi Notte
**Environmental Professionals of Arizona Scholarship Award**: Candice Giffin
**Morey-Vaughn Scholarship**: Candice Giffin

Graduate Awards

**Wyss Scholar Awards**: Elias Toon and Chelsea Silva
**Environmental Science & Policy First Year M.S. Research Proposal Poster Award** – First Place: Jessica Swetish
**Environmental Science & Policy First Year M.S. Research Proposal Poster Award** – Second Place: Chelsea Silva

Faculty Awards

**Gold Ax Award** (Faculty member having the most significant impact on undergraduate education): Dr. Angela Moline
Faculty, graduate students, alumni, and graduating seniors of SESES’s Environmental Programs gathered on April 24, 2014, for an evening of socializing and engaging in featured faculty research, current students’ thesis topics, and visions for the future of the program. The gathering took place after a long day of senior capstone internship presentations and was a welcome opportunity for faculty, students, and alumni to unwind together.

Erik Nielsen regaled us with tales of his adventures in the Honduran rainforest and outlined the devastating ecological impacts of drug trafficking. Another highlight of the evening was the first-year ES & P master’s students poster display and discussion of their proposed thesis research. Faculty and alumni judges selected the top two posters: Jessica Swetish earned the first place award of $250, and Chelsea Silva took home a $100 award for second place.

We will continue to hold this reception annually. Thanks to all who attended and participated in making this inaugural event a success. We look forward to seeing you next year!

Amy Wolkowinsky
SESES Outreach Coordinator
Amy.Wolkowisky@nau.edu
An Evening with Klaus Lackner,
Professor in the School of Sustainable Engineering and the Built Environment, and
Senior Sustainability Scientist in the Julie Ann Wrigley Global Institute of Sustainability

Closing the Carbon Cycle with Direct Carbon Dioxide Capture from Air
October 16, 6:30 – 8 p.m., at the NAU DuBois Ballroom

CSS Mixer with the Advisory Board,
Alumni & current CSS Students
October 17, 5-7 p.m. at the Lumberyard

2nd Annual Environmental Programs Spring Reception
April 24, 2015

We want to hear from you! Update your info and share your stories with us at
nau.edu/SESES-Alumni

Find SESES on Facebook, Twitter, LinkedIn