

Master of Environmental Studies Program



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“We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.”

- Aldo Leopold

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# MESsages

## letter from the director

Spring brings a number of thoughts to mind as we move through the academic year. This year had a number of LARGE projects on the calendar and we are moving towards the end of the year with some MAJOR accomplishments. Students, staff and faculty have been very successful at reaching academic and programmatic goals.

Beyond the MES program, Evergreen is moving into relatively new seas as the campus works to balance state budgets and secure academic leadership roles. Like a ship bobbing along with changes in tides, currents and weather, I

know that the MES program can handle tsunamis if necessary.

I am especially proud of the number of returning students who have committed themselves to completing their thesis projects. A thesis amnesty program, initiated by the Assistant Director, is making it possible for several students to return to campus after a number of years away from the program. The faculty, who were anticipating a need to support one or two more students, was so overwhelmed that the Provost's Office was asked to support our need for thesis readers. The PO's

support has made it possible for a number of students to complete their thesis and look forward to graduation.

We are also able to celebrate an exciting year of curriculum innovations. With the help of some amazing faculty, core and elective classes



*Martha Henderson*  
*(continued on page 3)*

## evergreen stormwater

By Evan Hayduk - MES Student

In Winter quarter 2011, I completed a stormwater project on campus made possible by the Cargill Sustainability Fellowship. In designing my contract, I tried to make the project interdisciplinary, to align with my studies in the MES program. I ambitiously set my goals high and happily dealt with those who were surprised by the amount of work I

wanted to accomplish in one quarter.

The first part of my project used Geographical Information System (GIS) software to map the stormwater system at Evergreen. I relied on as-builts of the system from facilities, informal interviews with campus staff and field verification to complete a map. This map also designated areas that contribute to

runoff, marked outfalls and labeled receiving waters. The layers of data that I created are now available on a public server at Evergreen. The final map I created also will become part of the Evergreen Stormwater Management Plan, the stormwater website, and completes a requirement of Evergreen's stormwater permit.

I also performed

*(continued on page 4)*

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## fostering an appreciation for forests, one field trip at a time

By Richard Bigley - MES Faculty

A five minute conversation charted my career course. It was during the summer between completing my B Sc. in botany at Washington State University and beginning graduate school at the University of British Columbia to study an invasive intertidal sea grass. My summer job was mapping intertidal and forest resources as part of an archeological project on the NW corner of the Olympic peninsula. The hope was that an understanding of past resource distribution would be a good predictor of seasonal camps of the landscape's inhabitants thousands of years ago. It was a great summer. I



*Richard in his natural habitat*

wandered the intertidal and mapped the distribution of clams, mussels and urchins and pondered changes in intertidal habitat due to isostatic rebound after glaciations. I wandered the forests mapping plant associations that contained cedar and wetlands that grow basketry materials.

Across the river from our camp was the head office of the timber company that owned much of the surrounding commercial forest land. I really needed aerial photos to help my resource mapping. Foresters use aerial photos. It was an inevitable encounter.

The chief forester was a personable chap; he had lived in the community for fifteen years, as had many of the other company employees. When I asked to borrow some aerial photos, I anticipated permission to perhaps come into their office and use a couple of stereo pairs at a time. To my utter shock, he produced the only complete set of photos in the office and said "they're yours, we're done." That week the office was closing. All the available timber had been cut, the clearings burned, replanted, and sold to an investment company. "We'll be back in 12 years to thin" the forester said (probably sensing my astonishment). I was thinking – that's no way to treat a forest-dependent community or a forest!

That brief conversation with the forester took root. I abandoned sea grasses after completing a M Sc. to study with a forest ecologist who looked at forests mostly as an ecological phenomenon, but also respected the social underpinnings. I have been doing the same for the last 25 years, working to return the forests of our landscape to predominance both physically and figuratively, and working to use forest science to change the world - one field trip at a time. Over the last 25 years, I have seen forestry completely transform from the tail-end of the exploitation phase to the regulatory phase, and now flirt with ecosystem-based management.

Forests influence every natural resource issue on our landscape. A basic understanding of site specificity, forest development, and habitat development is essential to be an effective participant



*Students from the 2009 Forest Ecology class*

in natural resource management issues. Without that understanding, one is susceptible to the merchants of doubt that lobby on both sides of every issue, often espousing distorted perceptions of how forests work. We owe it to our forested landscapes to be informed as how they did, do, and could even more so, support ecosystem functions.

*Richard Bigley has been teaching MES electives related to forest ecology and management at Evergreen for years. He will teach a sustainable forestry MES elective the Fall of 2011 (field trips required).*



*Students from the Fall 2010 Sustainable Forestry class*

*Letter from the Director (continued from page 1)*

are now streamlined into thematic areas. Classes were offered in areas of climate change and energy, ecology, and community sustainability. These classes focused on issues specific to the Pacific Northwest. As I write this column, a spring core class and an energy elective class are both on field trips, the former to the HJ Andrews Experimental Forest and Research Station located in Blue River, Oregon and the latter to the Energy Northwest center, Nine Canyon Wind and Solar Farm, and the Columbia Generating station. Field trips are a great addition to our curriculum.

The annual Rachel Carson Forum was breath-taking. I believe it was the best planned, best advertized, best attended, and best speaker in recent MES history. THANK YOU to the student organization and many others who made the event a real success. You

will find information on this event in the newsletter. Also read about second year student Heather Tucker's excellent presentation on Nisqually Delta tribal restoration work at the Association of American Geographers meetings.

Spring Quarter is always a time to celebrate numerous accomplishments. The first year class has passed their core classes and become full-fledged candidates in the program. Twenty seven students are now in the middle of the most demanding of the core classes, Quantitative and Qualitative Methods. The second year class is nearing the end of thesis writing. We will celebrate their individual research in Weeks 9 and 10 at thesis presentations. Finally, the big celebration, GRADUATION, will occur on June 10th in the Recital Hall on campus. This will be the first MES only graduation ceremony.

Even as we plan graduation, we are admitting new students for next year. Staff is beginning to plan orientation, solicit internships and coordinate faculty needs. We are hoping for the best during difficult state budget issues. The college welcomes a new Provost, Michael Zimmerman, and I look forward to initiating him into the realities of the MES program. Let the ship rock – we are ready!

## rachel carson forum 2011

By Tim Benedict - MES Student; MESA Organizer

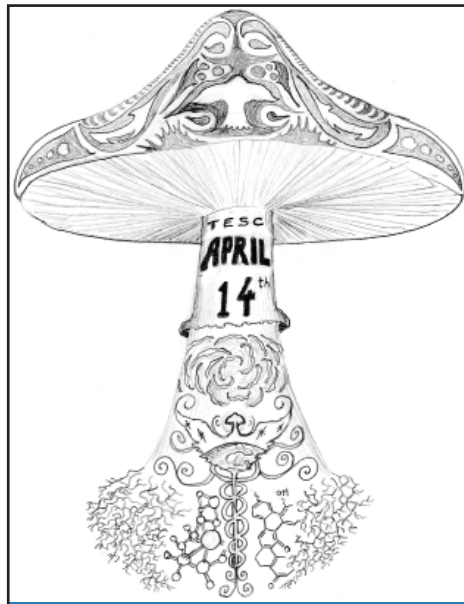
“MUSHROOMS CAN SAVE THE WORLD” was the proclamation of this year's Rachel Carson Forum, hosted at Evergreen on April 14th by the MES student organization, MESA. A renowned mycologist and Evergreen graduate, Paul Stamets, fascinated a packed audience of over 400 as he presented his discoveries and ongoing work.

Stamets' multimedia presentation showed the connections between fungus and the Earth's evolution, as it was explained that fungi initiated the re-colonization of life after each mass-extinction. He contends that mycelium, fungi's intricate root structure, is akin to the neurological network of the Earth, whereby it intelligently responds to its environment. With up to eight miles of mycelial strands per square inch of soil, it has the ability to filter contaminants from its surroundings (mycoremediation). Furthering this natural process, Stamets states, will be essential if we are to avoid a

sixth great extinction on our planet. Stamets has collaborated with numerous government agencies and laboratories and is currently overseeing lab work being conducted by Evergreen students who are testing the ability of fungus to remove fecal coliform bacteria (FCB) from water (mycofiltration). This natural biotechnology, if proven effective, could be used to clean campus runoff, protect the Puget Sound, our nation's drinking water and applied worldwide in environmental remediation efforts. To date, ongoing lab work at Evergreen has demonstrated an 87% filtration capacity of FCB with a strain of the Oyster mushroom (*Pleurotus ostreatus*).

Stamets' lecture covered a great array of other fascinating aspects displayed by specific mushroom species, such as the ability to hyperaccumulate Cesium 137 (consuming gamma radiation as a fuel source), grow in virtual darkness and high temperatures (climate change applica-

tions), act as a natural pesticide and effectively boost the human immune system. This last discovery was illustrated in a personal story Stamets told



of helping his mother overcome breast cancer with the use of the Turkey Tail mushroom. This and other mushroom extracts, are sold by Stamets' local

Evergreen Stormwater (continued from page 1)

water quality monitoring at the two major stormwater outfalls on campus. After multiple tests and attempts I finally found equipment that would work for my desired testing. For this, I did extensive background reading on which tests to perform, and had to learn and closely follow the standard methods for measuring fecal coliform (FC) from water samples. My technique improved with each weekly test, and I was able to amass eight weeks of solid data on FC levels and other background parameters.

The third part of my project involved outreach on campus. I provided input to Robyn Herring, my field supervisor, about which informational brochures would be distributed to students living on campus. I also went through the process of presenting to the Campus Land Use Committee (CLUC) about installing pet waste control signs at campus trailheads in an attempt to limit pet waste contamination of campus streams. The signs will be erected in the coming months.



The final stated aspect of my project was a literature review of how campuses and municipalities check their stormwater systems for illicit connections. Evergreen is required to develop a Illicit Discharge Detection and Elimination (IDDE) program, and I completed the background research to begin the process.

My GIS maps also accomplished the first step of the IDDE program. I researched high FC levels effects and source species of FC contamination. I found that testing stormwater effluent for ammonia is a simple and cheap way to eliminate humans as source. I implemented ammonia tests into the final four weeks of my FC testing, and all tests were negative, eliminating humans as a source. This of course was a relief to Robyn and facilities, since an illegal cross con-

nection with a sewer pipe would be a costly fix.

On top of my stated goals, I took on extra lab work related to FC remediation. I worked with Tim Benedict, a cohort, and Fungi Perfecti to test the ability of fungi mycelium to remove FC from water. We completed three tests of passing sample water through woodchips inoculated with oyster mushroom spores and compared the results to base levels of FC from one of the stormwater outfalls and a control of plain wood chips. The results were indeed promising, and Fungi Perfecti was very happy that we were able to complete tests of their technology in a lab environment that they have not been able to complete.



*Evan is a first year MES student.*

Rachel Carson Forum (continued from page 3)

business, Fungi Perfecti.

In concluding his lecture, Stamets offered advice in approaching the sciences, and life in general. He advocates that we should all dare to be different, dare to be wrong, dare to explore and dare to challenge conventional wisdom... as that is what monumental discoveries are founded upon. It will be hard to match such an inspirational presentation for next year's Rachel Carson Forum but in-

deed we will, as these are exciting and revolutionary times for the sciences and innovators are emerging from the woodwork!

Thank you to MESA Members that volunteered during the day of the event and helping to make the Rachel Carson Forum a success. A special thanks to the following MESA members who went above and beyond to help plan the event: Tim Benedict, Stephanie Blumhagen, Deb-

bie Dozier, Nahal Ghohgaie, Chris Holcomb, Melanie Kincaid, Don Loft, Amanda Lucus, and Allison Smith. This event was made possible through funding by the Student Activities Board. MESA would also like to thank our adviser Andy Corn, the MES faculty and staff for helping with and promoting this event, and Dusty Yao for coordinating Stamets to come to campus.

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## alumni corner

### Anna Bachmann - 1997 grad

Anna Bachmann has been working with Nature Iraq, an Iraqi conservation group, since 2005. She met the group when working as an independent researcher in Iraq in 2004. She is currently their Director of Conservation and has been managing a project, called the Key Biodiversity Areas Project, to identify globally important sites of biodiversity throughout the country. This project is conducted in cooperation with the Iraqi Ministry of Environment and the identified sites will form the basis of Iraq's future protected areas network.

In addition, Anna has initiated a new project called the Iraq Upper Tigris Waterkeeper (IUTW). Ever since her first trip to Baghdad in 2003, Anna has been fascinated by the rivers of the country. In 2004, she led a water quality sampling project in Baghdad on the Tigris River, which she coordinated with the Iraqi Ministry of Environment, Iraqi Police, local and international media, and Coalition forces. The primary problems of Iraq's watersheds are related to pollution, degradation

to the rivers themselves, and upstream water diversion projects, particularly dams in Turkey, Syria and Iran. Iraq's biblical rivers and marshlands and the people who rely upon them need an advocate and a strong voice to raise awareness in local communities.

Being familiar with the work of the Puget Soundkeeper in Washington and the Hudson Riverkeeper in New York, Anna initiated IUTW project, which will be associated with these excellent organizations through the Waterkeeper Alliance (WKA), a network up of over 200 water, river, sound, marsh, canal keepers all across the globe. The WKA has accepted the Iraq project as its newest program and the first in the Middle East. It will focus on rivers within Iraq's upper Tigris Basin but Anna hopes to expand the project to the south and west to eventually cover the entire Tigris-Euphrates Basin within Iraq.

Nature Iraq was recently featured in Grist magazine. You can find out more about Nature Iraq and Anna's work at: [www.natureiraq.org](http://www.natureiraq.org)



### Stephanie Gowing - 2009 grad

As an MES student, Stephanie explored different areas of focus from pursuing her LEED AP exam to working with Evergreen's Climate Mitigation report. Because of her interest in waste management and the built community, she focused her research on deconstruction. Since graduating from MES she worked at the City of Tacoma's Office of Sustainability, led a 'green business' program at the Tacoma Pierce County Chamber and is now working at Environmental Coalition of South Seattle (ECOSS) as a Sustainable Business Coordinator. In Stephanie's words, "Evergreen's



program worked really well with my schedule as I worked full time during my entire enrollment. I finished in 2.5 years and it opened my eyes to jobs I had never thought of before."

## mes students present

MES students Tim Benedict, Zach Maskin, Laysa Rodrigues, Tim Rogers, Austen Walsworth, and MES faculty Kathleen Saul will present at the Mother Earth News Fair in Pullayup, WA on June 5. The presentation will focus on Pacific Northwest energy issues and possibilities for renewable energy. Come out to support MES! More info at: [www.motherearthnews.com](http://www.motherearthnews.com).

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## 2011 annual association of american geographers conference

### Heather Tucker - MES Student

I was recently given the opportunity to represent my employer, United States Geological Survey (USGS), as well as the Nisqually National Wildlife Refuge (NWR), at the Association of American Geographers (AAG) Annual Meeting in Seattle. My purpose was to present preliminary results of the work that my USGS crew and I perform at Nisqually NWR; talk about my position as part of the USGS team; and discuss the environmental monitoring relationship we have with the neighboring Nisqually Indian Tribe.

I began working with USGS after my first year as a graduate student in the MES program at Evergreen in June 2010. Since then, I have been in a SISNAR position, or Student Interns in Support of Native American Relations. The responsibility of my crew are to monitor the biological and physical changes that have occurred within the Nisqually River delta since the removal of the dike in 2009. Some preliminary results from our monitoring efforts that were presented at the AAG Conference included abiotic changes such as sedimentation, elevation, geomorphology, hydrologic, photodocumentation, water quality, aerial photography and remote sensing. Other monitor-

ing efforts presented included biotic changes within avian, benthic invertebrate, fish and vegetation communities.

The particular conference session that I was asked to present at was Tribal Rivers as Confluences of Environmental and Cultural Restoration because of our close estuary monitoring relationship with scientists from the Nisqually Indian Tribe. Other participants within my session included Patricia McDowell from the University of Oregon, Seth White from the Columbia River Inter-Tribal Fish Commission and Viv Sinnamonn from the Kowanyama Aboriginal Tribe of Australia. In many tribal communities, rivers support biota that are important to the maintenance and restoration of tribal cultures and lifestyles. Therefore, river management and restoration can be important factors determining the overall cultural health and welfare of tribal communities. This session highlighted the growing role that tribal culturally important species for tribal communities, governments and agencies play in the collaborative management and restoration of rivers that support resources of special tribal significance, including fish, birds, mollusks and native plants just to name a few.

Our presentations were to describe ecological linkages between river processes and life histories of ways in which tribal or aboriginal viewpoints have influenced river science, management, or restoration programs, and/or the growth and significance of tribal programs that promote innovative collaboration in the management and restoration of rivers with special importance to Native American tribes.

Attending this conference was a fantastic opportunity to meet and converse with scientists from various disciplines, not just geography, and such participation reiterated to me the interrelationship of all scientific disciplines. From this opportunity, I was able to convey the importance of our work at Nisqually NWR and the close working relationship we have with the Nisqually Indian Tribe. It also provided an opportunity to learn about research projects that are occurring here in the Pacific Northwest, the rest of the United States and even abroad. If given the opportunity to attend this event again in the future, I would definitely take it and highly recommend it to any others that might also be given the chance to attend.

## MES fall 2010 and winter 2011 graduates

*Sarah Clarke*

*Jill Politsch*

*Douglas Littauer*

*Stephanie Sparks*

*Lisa Macki*

*Heather Tschaekofske*

*Barbara Moeller*

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