GREENovation
Fall 2014

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Cover Photo:
A harbor seal (Phoca vitulina) in Scotland. Several GMU faculty, students and alumni presented at the 3rd International Marine Conservation Congress in Scotland in August. (More on page 11)
by Samantha Oester
August 2014
**GREENovation** Fall 2014 Contributors

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**Contributors**

Dr. Chris Parsons: **Editorial:** *So you think you’re ready for comps?* (Page 4)

Dana McCoskey: **Graduate Essay:** *Conservation in a Developing Nation: The Maasai Mara National Reserve in Kenya* (Page 6)

William Norfolk: **Graduate Research:** *The Changing Face of Caribbean Reefs: Investigating the effects of the threespot damselfish (Stegastes planifrons) on critically endangered staghorn coral (Acropora cervicornis)* (Page 8)

Michael Latimer: **Events at Mason:** *The 2015 Washington Youth Summit on the Environment* (Page 10)

ESP Faculty & Students: **Conference Focus:** GMU faculty, graduate students present at the 3rd International Marine Conservation Congress (Page 11)

Rachel Golden: **Book Review:** *God Species: How the Planet can Survive in the Age of Humans* (Page 13)
You give a final draft of your PhD proposal to your advisor to comment on. It should take two or three weeks to provide edits and feedback. When the proposal is approved, you send it to your other committee members for comments and approval.

This is a good time to also ask committee members if there are any special requests that they have regarding your comprehensive exams. Yes, your comps. Some faculty will provide reading lists; others will give you topics to revise. For example, I request students to revise and read around the topic of conservation (marine conservation, usually), although I don’t give specific readings.

Then...

Select a day for your defense. This is harder than you think, and the later you leave it in the semester, the harder it will get. This is a major cat-herding exercise. It is possible to Skype people into the meeting (although Skyping in more than one is difficult, to say the least). Try using a doodle poll (www.doodle.com), although be warned that many faculty ignore doodle emails.

Request written questions from committee members. Send out reminders to your committee for written questions about five weeks before your comps, and allow two weeks for questions to arrive. Send out a reminder four weeks out and three and half weeks out.

The format of questions varies. Some faculty like to give one multipart question. Faculty that specialize in methods may give you statistical problems. I give essay questions typically: 4-6 questions from which you choose 2-3. I typically ask students to allocate an hour to an hour and a half for each essay (depending on how many I give). The exam is closed book/notes/no internet. My questions are usually relatively open-ended to test what you know, and how you can innovate, rather than trying to catch you out on minutiae that you don’t know. But, each advisor has a different format for comps questions.

You should allow yourself a week to do your questions. Then, submit them directly to the committee member concerned (CC’ing your advisor).

The two-week gap between your comps and your proposal defense and orals should be enough time for your committee to grade your questions. The grades are usually: high pass/pass/borderline pass/fail (i.e. A-D).

The Proposal Defense/Oral Exam: The proposal defense/oral exam usually takes about three hours.

Give a 35-45 minute PowerPoint presentation on the background and methodology of your project. Make sure (as in your proposal) you outline the hypotheses you are testing, the methods you are
using to test these (especially statistical methods) and the structure of your dissertation (i.e. what will the chapters be).

Please practice your presentation thoroughly, *multiple times* before the proposal defense. I highly recommend practicing in front of an audience of both fellow grad students and family (the former for technical issues and the latter for presentation style and clarity – if you have non-scientists in the family who can understand exactly what it is you plan to do, then your committee will understand, too).

Your committee will ask you questions throughout the presentation. At the end of this, there are likely to be modifications and edits that your committee require to your proposal. It is very rare that there are not at least some edits. If the committee members have done their job properly, all of the major issues should have been addressed in the proposal reviewing phase.

After the proposal has been presented and questions related to that have been asked, the committee will move to the second phase of the oral examination and will ask you general questions. These questions will be issues or topics that a PhD student undergoing the project you are doing, with the courses you have taken, should generally be expected to know.

Different committee members have different styles for this part of the examination. I like to ask “out of the box” questions occasionally, just to see how you can pull information from different sources together. Current hot topic issues in your field are also fair game. Sometimes committee members will ask you about the answers on your written exam. Be warned that some committee members like to ask increasingly harder and harder questions on topics until they can find a question that you cannot answer. Be aware that some faculty can treat comps as a “hazing” and can be deliberately aggressive or difficult.

After this process, you will be sent out of the room and a determination will be made. Even in the best defenses/oral examinations, you are likely to need to do some editing or revisions as issues or ideas crop up during the proposal presentation.

Bring your proposal title page (and program of study form) to your orals, as this will be the best opportunity to have all of your committee sign it. Even if some further editing is required, either your advisor or the Graduate Office (Sharon) can hold onto the title page until everyone is satisfied with the proposal. Once the proposal has been approved, please turn it in to the Graduate Office and it will be sent to the Dean.

One important note – you can bring snacks and coffee to the proposal defense/orals. Coffee and snacks can help to break the ice and lead to a more relaxed examination. But it’s not compulsory.

**Once the proposal defense is over:** After your comps, you should feel like you’ve been through the ringer, but you should also feel that your proposal has been thoroughly peer-reviewed and your intellect exercised. If you are well prepared, the comps can actually be very enjoyable in a vigorous mental hike/jog sort of way.

*Then the next stage is writing the thesis...*

- *Dr. Chris Parsons is an associate professor and the undergraduate coordinator in the Department of Environmental Science and Policy. He was the chair of the 2014 International Marine Conservation Congress and a governor of the Society for Conservation Biology. He is also a national delegate to the Scientific and Conservation Committees of the International Whaling Commission*
Graduate Essay:

**Conservation in a Developing Nation:**
The Maasai Mara National Reserve in Kenya

By Dana McCoskey,
GMU Graduate Student

Miles away from Nairobi Kenya’s diesel smells, hand painted shop signs and red broken earth construction projects, are the places wild and stunning enough for a developing nation to shift its focus towards conservation. The Maasai Mara National Reserve (MMNR) is one such biologically important place in southwestern Kenya that I visited in January with a GMU study abroad course. The word *mara* means spotted in the Maasai language, and describes how this landscape looks from afar – spotted with acacia trees, Maasai herdsman, or animals.

Although the MMNR is still exceedingly wild with 1,510 km² of the greater Mara-Serengeti ecosystem’s land protected through this reserve¹, over 470 species of birds², and apex predators that regularly wander through Maasai villages and tourist establishments at night, the region faces numerous threats as change occurs rapidly to meet development goals backed by foreign investments.

Since the MMNR is one of the most promising destinations to view all of the African “Big Five” game animals, African lion (*Panthera leo*), African elephant (*Loxodonta africana*), Cape buffalo (*Syncerus caffer*), African leopard (*Panthera pardus pardus*), and rhinoceros (*Diceros bicornis*), safari tourism is expanding. Yet, providing infrastructure for tourism brings both promises and perils.

The juxtaposition of ramshackle corrugated metal buildings at the outskirts of the MMNR and a lack of basic municipal waste management, to large luxury camps whose plastic tents blindingly reflect the sun is quite stark. Moreover, the region is experiencing an unprecedented land use trend by the Maasai people, who are moving away from their historically nomadic lifestyle in favor of establishing permanent village settlements.

Since tourism is Kenya’s the second largest source of revenue, accounting for 10% of the GDP, the government is interested in both increasing tourism activities and protecting the wildlife that people travel from all over the world to see (G. Otiang’a Owiti, personal conversation, January 10, 2014). Many officials see ecotourism development as an important way to use the national parks to provide long-term eco-
onomic opportunities for the surrounding communities, which is an important element to discouraging poaching activities that have increased dramatically in the past three years\(^3\).

Despite these benefits of sustainable development and providing alternatives to crime, an increasing capacity for ecotourism could be problematic if the people with land tenure are not included in regional planning or if programs inadvertently degrade the environment. Since diverse groups including private wildlife ranches, city councils and non-profit conservancies manage the MMNR and its surrounding lands, the philosophies and greater vision of how the region should develop are variable.

In the Naltarakua (Red Cedar) Village, a small settlement of 6 dung and earth family homes surround a large central boma livestock corral, children are delighted to play with old car tires while small groups of tourists wander through. In this modern Maasai community lives rich with cultural tradition have met technology; barefoot herders in bright red shuka fabrics are often seen with their animals talking on mobile phones. Sitting on the dung earth of his childhood home, I spoke with Benjamin, a Maasai man who learned English from the Canadian missionary school and recently graduated from college in Nairobi, about the life in the Mara. He spoke of elephants destroying agriculture attempts and how the “people like us” (westerners) showed them how to set up a tourist shop for their hand-crafted products so they could make money to buy food, and how they discouraged farming since unpredictable animal movements make crops unreliable.

He told me his generation did not like the traditional cows-blood drink that I had learned about on National Geographic and that when he went to Nairobi his tastes changed to prefer Coca-cola, all while assuring me that cows are still the center of Maasai life. He spoke of the different animals that punctuate village life with variable reverence, amusement and frustration. I told him about the people I have met that have helped villagers protect their crops from elephants by installing honeybee hives with wires that would trigger a swarm if crossed and I showed him illustrations in my field guide of the species I was keen to see. I realized I was waiting to cross paths with these animals while his community was waiting for some of the simple things tourism revenues might afford them, when it is the developers’ plans that will ultimately affect both wildlife and the Maasai way of life.

References

Dana McCoskey is a graduate student in the Environmental Science and Policy Program. Her research interests are in avian ecology, forestry and conservation.
Graduate Research:

The Changing Face of Caribbean Reefs:
Investigating the effects of the threespot damselfish (*Stegastes planifrons*) on critically endangered staghorn coral (*Acropora cervicornis*)

By William Norfolk,
GMU Graduate Student

During the past three decades a massive 98% decline has occurred in the historic population levels of acroporid corals: staghorn coral (*Acropora cervicornis*) and elkhorn coral (*Acropora palmata*). Staghorn and elkhorn corals are both stony corals, meaning they secrete a hard calcium carbonate skeleton on which the coral tissue grows. Historically acroporid corals have functioned as the primary reef-building corals in the Caribbean creating the majority of the complex three-dimensional structure and habitat space that makes coral reefs diverse. With the large-scale loss of acroporid corals, Caribbean reefs have experienced a phase shift towards a reef dominated by soft corals which reduces the complex structure of the reef and can lead to declines in reef biodiversity.

A great portion of the acroporid coral decline can be attributed to the spread of white-band disease (WBD) through staghorn and elkhorn corals (Gladfelter, 1982). WBD is a coral disease characterized by sloughing tissue, usually starting at the base of a coral until it reaches the apical tips. The necrosis of the living tissue (Peters et al., 1983) reveals the underlying white calcium carbonate skeleton for which the disease was named. Though widespread through the Caribbean, the pathogen(s) causing WBD continue to be debated, but appears to be bacterial in nature. Transmission studies have suggested that WBD can be transmitted to corals through a vector organism. The corallivorous snail Coralliphila abbreviata has been suggested to be associated with the spread of WBD (Gignoux-Wolfsohn, et al. 2012). Further research is needed to investigate the vector potential of the bearded fireworm (Hermodice carunculata), the threespot damselfish, and butterflyfish (Chaetodontidae), which are commonly associated with acroporid corals.

My research project aims to investigate the impact of the threespot damselfish on staghorn coral health. The threespot damselfish is a demersal species of damselfish that preferentially inhabits thickets of staghorn and elkhorn coral. The threespots exhibit a behavior known as “algal farming” where the fish bites at the living coral tissue to expose the underlying coral skeleton (Kaufman, 1977). The exposure of the coral skeleton creates a favorable environment for the settlement of macroalgae creating what is called an algal lawn, which serves as the primary food source for the threespot (Hinds and Ballantine, 1987). Little is
known about how the colonization of staghorn thickets by threespot damselfish affects the overall health of the coral thicket. The primary focus of my research is to investigate the effects of damselfish colonization on staghorn coral health, and to investigate the threespot damselfish as a potential vector for WBD.

Samples of both threespot damselfish and staghorn coral are being collected in the Florida Keys from staghorn coral thickets that have been outplanted through restoration efforts. Two coral branch pieces are collected from each coral thicket: one piece from a branch damaged by damselfish predation and a second from an undamaged branch. The two pieces will be examined histologically to determine the overall health of the coral. Samples of the resident damselfish from the coral thicket will also be collected. Damselfish samples will be dissected and the gastrointestinal tract will be isolated and examined histologically. Samples of both damselfish gastrointestinal tract and coral branches will be compared to determine similarities in bacterial presence to investigate damselfish as a vector of WBD.

With such extensive loss of historic staghorn coral populations, understanding how closely related species affect coral health is paramount to the conservation of the species as a whole. Little is known about how threespot damselfish affect the staghorn coral that they use as habitat, and this study will provide valuable information about the two species and their interactions. The investigation of the threespot damselfish as a vector for WBD will also provide useful information to perhaps reduce disease spread through outplanted restoration corals and will provide further information to identify the putative pathogen of WBD. Understanding how damselfish affect corals will provide much needed information to improve restoration efforts and will further our understanding of Caribbean coral reef ecosystems as a whole.

References:

• William Norfolk is a graduate student at George Mason University currently pursuing a master’s degree in Environmental Science and Policy. His research interests include marine biology, primarily coral reef ecology and coral disease. He works in the George Mason Histology Laboratory under Dr. Esther Peters and is also a teaching assistant for EVPP 110 and 111 labs. This summer he worked as an intern with the Coral Restoration Foundation in the Florida Keys.
George Mason University will be welcoming about 250 high school students from across the country for the annual Washington Youth Summit on the Environment. The Washington Youth Summit on the Environment, which runs from June 28 to July 3, 2015, will give youth delegates a hands-on experience and an integrated and forward-thinking approach to the environment.

This is the 6th year George Mason University and its renowned partners, the National Geographic Society and the Smithsonian National Zoo, have hosted the Washington Youth Summit on the Environment. Last year, the youth delegates had the opportunity to visit the Smithsonian National Zoo, Smithsonian Conservation Biology Institute, the National Aquarium, and the National Geographic Society’s Headquarters. Delegates also had meetings with congressional representatives on Capitol Hill.

The Washington Youth Summit on the Environment had many people in the environmental field come speak to the students, including two keynote speakers:

- **Martin Chavez:** Senior Advisor for the Hispanic Technology and Telecommunications Partnership, former Mayor of Albuquerque, and former Executive Director of USA ICLEI (International Council on Local Environmental Issues).
- **Gina McCarthy:** Administrator of the U.S Environmental Protection Agency

If you are interested in learning more about the Washington Youth Summit on the Environment or participating as a staff member, you can review the website [www.wyse.gmu.edu](http://www.wyse.gmu.edu) or contact Richard Friesner at rfriesne@gmu.edu and (703) 993-5417.

*Delegates of the 2014 previous Washington Youth Summit on the Environment on Capitol Hill*

*Delegates of the Washington Youth Summit on the Environment on a behind-the-scenes tour at the Smithsonian National Zoo*

*Michael Latimer is a sophomore at GMU in the Environmental Science program. He is an alumnus of the Washington Youth Summit on the Environment.*
George Mason University was well-represented at the world’s leading international marine conservation conference. The following George Mason University Environmental Science and Policy faculty, adjunct faculty, graduate students and recent graduates presented at the 3rd International Marine Conservation Congress, 14-18 August 2014 in Glasgow, Scotland, UK. Several additional GMU ESP and Biology Department faculty, students and alumni also attended the conference.

**Meeting Chairs**
Chris Parsons – Conference Chair
Samantha Oester – Conference Co-Chair and Communications Chair
Katheryn Patterson – Student Activities Chair

**Convenors and Organizers**

**Chris Parsons:**
- Co-Convenor – The verdict on marine megafauna tourism is in: where do we go from here?
- Co-Convenor – Integrating marine mammal conservation: human dimensions and the practitioner
- Co-Convenor – Marine animals in conservation: ethics and welfare

**Samantha Oester:**
- Convenor – Using social media to make your marine science matter
- Convenor – Talking the talk: effective and engaging presentations
- Convenor – The science of conservation communication: effective outreach through the media
- Organizer – Filmmaking session: featuring BBC Ocean and Clyde Reflections.

**Sean Tracy:**
- Convenor – Incorporating issues of marine conservation into the classroom: a lesson-sharing session.

**Katheryn Patterson:**
- Organizer – Conservation conversations: beyond business cards
- Organizer – Want to save the world” Here’s how: skill sets a; marine conservationists should have.

**Megan Draheim:**
- Convenor (& Chris Parsons Co-Convenor) – Human-wildlife conflict: complexity in the marine environment

**Andrew Wright:**
- Convenor – Competitive outreach in the 21st century: why we need conservation marketing

**Additional Presentations**

**Draheim, M.** Reducing marine animal welfare problems: a sociocultural approach.

**Jones, R.C.** 2014. Tracking estuary restoration in a tidal freshwater embayment, from nutrient loading reductions to bloom abatement to aquatic plant recovery.


**Parsons, E.C.M.** et al. 2014. Key research questions of global importance for cetacean conservation.


Scarpaci, C. & **Parsons, E.C.M.** 2014. The current state of the whale-watching industry around the globe.

**Scott, C.A. & Parsons, E.C.M.** 2014. “Cute and cuddly boys, cute and cuddly” – simply changing animal names can impact conservation concern.


**Wright, A.J.** 2014. An introduction to conservation marketing


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Do you know of another recent conference where GMU was well-represented? Submit info. to soester@gmu.edu
Green Happenings @ Mason

- Faculty members of George Mason University’s School for Conflict Analysis and Resolution were joined by graduates of the school for a weeklong conflict assessment and resolution workshop in Bogotá, Colombia in June. Participants from ten Latin American countries attended the sessions, presenting conflict cases from their home communities in the hopes of learning how to resolve them. The focus this year was on the management or exploitation of natural resources—environmental conflicts that often involve the rights of indigenous peoples, adding cultural and ethnic variables to the conflicts.

- ESP Professor Dr. Thomas Lovejoy was awarded the Woodrow Wilson Award for Public Service. Lovejoy is the eleventh recipient of this award, being honored for his outstanding environmental work on biodiversity, climate change in Brazil and elsewhere, and is the first scientist to be so recognized.


- Mason Dining conducted the Real Food Challenge in Summer 2014 in an effort to further improve the quality of food GMU serves by sourcing more local, organic, fair trade, and humane products. Two new student sustainability interns are evaluating food purchasing and working toward a goal of 20% local food by 2015.

- In an effort to address food insecurity and reduce food waste in the dining halls, Mason Dining is collaborating with the Center for Leadership and Community Engagement. Working with sustainability and social work classes to address food insecurity. The Campus Kitchens Project also provides volunteer opportunities for students.

- A plant care assistant position was hired for GMU Student Centers to assist with plant care and sustainability efforts.

- The Fall 2014 EcoScience+Art event featured internationally acclaimed eco-artist Jackie Brookner. EcoScience+Art is a new initiative and collaboration between the arts and sciences at George Mason University. It is their mission to bring together individuals working across the boundaries of ecosystem science, art, and design fields to share knowledge, expertise, and wisdom for creatively engaging in the common pursuit of a sustainable future. The founder and director is ESP professor Dr. Changwoo Ahn. The co-director is School of Art professor Dr. Mark Cooley.
**Book Review:**

**God Species: How the Planet can Survive in the Age of Humans**

*By Rachel Golden, GMU Graduate Student*

Lynas preaches to the choir of utilitarian environmentalists who believe in top-down, technological fixes to wicked environmental problems.

In his non-fiction narrative, Mark Lynas offers an in-depth and somewhat contentious perspective on "mainstream environmentalism" and suggestions for addressing the challenges of global sustainability. I appreciate his systems approach which addresses set "boundaries" or limits on the biosphere, such as nitrogen, climate, biodiversity, and toxics. As such, his lens offers an excellent approach to understanding sustainability.

Readers will likely (well...hopefully!) already understand the threats and facts that he lays out - biodiversity loss, GHG emissions, DDT, and others. As such, some of his examples read like an introductory environmental science text book. So, how does Lynas suggest we solve these problems? The same way we have been - with technology - but now, we should diversify and use innovative solutions.

Lynas urges policy makers to emphasize techno-fixes to environmental problems, many of which have been created via the misuse or overuse of certain technologies (oil and coal extraction, toxic chemicals, etc). Lynas seems to suggest that we cannot fight human nature; humans are inherently prone to creating and improving technologies. We should not waste our time changing behavior and utilizing bottom-up approaches such as grassroots campaigning and education. Instead, we should harness the desire to research and develop in order to "fix" our problems. The US government has been harnessing the techno-fix approach for years and isn't about to stop now.

What are some specific solutions that Lynas offers up? Some ideas include nuclear power, densification of urban areas, and intensification of agriculture. To me, as a young conservation scientist, these solutions do not sound as radical as Lynas suggests that they do. In fact, they do not sound radical at all. I have read about these and many other techno-solutions such as geoengineering and GMOs for as long as I have been involved in this discipline. I offer a criticism of this narrative: Lynas regularly refers condescendingly to "Greens" or mainstream environmentalists, to whom he believes to be addressing.

He believes he is being novel when he suggests that organic farming isn't perfect, biofuels consume too much land, or payments for ecosystem services are the way of the future. While not novel approaches, Lynas does provide an excellent synthesis of the issues at hand and offers a comprehensive set of solutions to address it. He, however, fails to address political feasibility of any of these solutions or consider the stark reality of political inertia on a national and international scale.

I recommend this book especially to instructors in environmental science, policy, sustainability science, conservation, economics - any discipline related to applying real science to real solutions. I would highly recommend it to students in an introductory environmental science course - it does cover lots of material and is easy enough to read. I would also recommend this to those who don't necessarily love the ideas of nuclear power or GMOs - your opinions may be tested in unique ways after reading this book!

What do you think is the most pressing environmental issue facing us today? Is it climate change? Biodiversity loss? Over-population? A combination of threats and positive feedbacks?

What about solutions? Must we rely solely on technological solutions (such as nuclear power and genetically modified crops) or should we diversify our strategies to include bottom up approaches (such as education and grassroots work)?

- Rachel Golden is a first year Ph.D. student in the Environmental Science and Policy Program working with Dr. Tom Lovejoy. She plans to focus her Ph.D. research on evaluating the management effectiveness of protected areas in the Amazon, taking historical changes to protected areas’ status, size, and ownership into account. Find more on her website: rachelegolden.com.
The ESP-GSA is a GMU organization, open to all graduate students in the ESP department as well as any graduate student interested in environmental science and environmental policy. A membership application can be downloaded from the ESP GSA website.

**ESP GSA Goals**

- To foster a sense of community
- To increase communication within the ESP department and with other GMU departments
- To advocate for graduate student interests and concerns
- To provide a unified voice for members
- To provide extracurricular activities and have fun!
- To provide special academic events relevant to student interests
- To showcase graduate student achievements
- To foster graduate student and faculty interaction

**ESP-GSA Committee 2014-15**

President – **Chelsea Romulo**
Vice President - **Advait Jukar**
Secretary – **Jenell Walsh-Thomas**
Treasurer – **Adrian Dahood-Fritz**
Social Chair – **YOU??**
Student Representative – **Sarah Kuppert**
General email : **espgsa@gmu.edu**
Faculty Advisor: **Dr. Chris Parsons**