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Message from the Editors:

As the temperature slowly drops and the leaves begin to fall off the trees, the EPIB Trail writers have been busy working on our November edition. There are plenty of thought provoking articles to delve into, including topics like a campus wide ban on plastic bags and bottles, the California drought, and the implications of agri-tourism in the fall months. We hope you truly enjoy this issue, and would like to thank all of our readers for your continued support and kind words of encouragement.

Have a Happy Thanksgiving!
Holly, Francesca, Selen, and Chloe’

Meet the Writers

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Reality Check: A Study on Homelessness in New Brunswick

By Arcadia Lee Papalski

How many times were you stopped today on your way to class when somebody on the street asked you for money? They may have had a story about why they needed money to “get home” or told you they were hungry. You may have wondered where they planned to spend your hard-earned money. Regardless of your ponderings, homelessness, poverty, and unemployment in New Brunswick is a serious problem. Whether or not we choose to recognize it, it’s a very real problem and it is very close in proximity to our lives.

Here are the statistics: estimated household income in New Brunswick in year 2012 was $39,284 (only $3,000 more than in year 2000), estimated house or condo value in 2012 was $238,706 (over $100,000 more than year 2000), and median gross rent in 2012 was $1,320. As of January 1, 2014, minimum wage in NJ was set to $8.25/hour. That means someone who works forty hours a week on minimum wage would make $3,120/month (not including taxes). This means someone who is living on minimum wage cannot afford to pay rent, let alone, afford to own a house or raise children in New Brunswick.

In 2007, Middlesex County’s political leaders announced their ten-year plan to end homelessness in our county. The total number of homeless has steadily been increasing since the start of their plan. The statistics for Middlesex county was reported as follows: in 2009: 756 homeless, in 2010: 1,536 homeless, in 2011: 945 homeless, in 2012: 1,145 homeless, and in 2013: 1,528 homeless. In 2007, the county population was at 779,830 and in 2013 we are at 828,919. Increasing number of total county residents may explain the reason for rising homeless populations.

Since 2005, New Brunswick unemployment rates have ranged between 3.8% in October 2007 and 9.1% in June 2009. As of October 2014, unemployment was found to be 5.8%. According to the annual Point in Time Survey (PIT)/Project Homeless Connect (PHC) in Middlesex County for the year 2014, 801 people were homeless on the night of the count. This number does not reflect people receiving Temporary Rental Assistance (TRA) for the County Board of Social Services. This means that approximately 2000 people are currently homeless in Middlesex County. For those of you who are curious, of the 801 who were snapped in the PIT survey, 531 were in emergency shelters, 168 were in transitional housing and 102 were unhoused.

So, what can we do to help solve poverty issues in our community? Should we do anything to solve this problem? What caused the value of houses to increase over the last 14 years? How do families survive on minimum wage? Do Social Services provide enough for these families? Does giving a homeless person on the street a dollar actually help them? Are there other ways we can contribute to the cause? These and others are all questions we may want to consider. I strongly encourage our community to think about our decisions and to question our surroundings.

If you know of anyone who is homeless, here is a link where you can find homeless shelters any area from the U.S. Department of Housing and Urban Development (HUD) and the Homeless Shelter Directory (HSD):
⇒ http://www.homelesshelterdirectory.org/cgi-bin/id/city.cgi?city=New%20Brunswick&state=NJ

Sources:
http://www.homefacts.com/unemployment/New-Jersey/Middlesex-County/New-Brunswick.html
http://newbrunswicktoday.com/article/annual-homeless-count-attracts-hundreds-city-soup-kitchen
Students at Rutgers University really want to see the school live up to its values. We market our school as a leader in environmental research, education, and outreach, so shouldn’t our campus follow as many sustainable practices as possible? The student-run “Take Back the Tap” and “Ban the Bag” campaigns believe that ditching plastic bottles and bags is imperative in changing our behavior to respond to the environmental issues that our world faces today.

“Take Back the Tap is a campaign on campus that consists of students working to educate the Rutgers community about the bottled water industry and the many environmental and economic downsides that accompany water privatization. Overall, we are fighting to ban the selling of bottled water at Rutgers to create a more sustainable university. To do this, we are gathering petition signatures, forming coalitions with other like-minded student groups and faculty, and advocating for updating the university’s water infrastructure by means of installing more filtered water stations (hydration stations) across campus”, explained club president, Lindsey Sigmund. Only twenty percent of the plastic bottles we drink get recycled; the rest end up in the garbage or as litter on our land and in our water. Our landfills already hold two million tons. As I type this article, I am sitting in my dorm lobby on campus. Behind me stands an Aquafina vending machine selling plastic water bottles, Pepsi, and Mountain Dew soda, which are all arguably socially irresponsible products. Rutgers could better serve their students by replacing these vending machines in dorms, academic buildings, and student centers with water refill stations, which would help them avoid bottled water (and sugary drinks) in their home away from home.

Dr. Michael Warhurst, Friends of the Earth’s senior waste campaigner, believes the bottled water trend is severely harmful to us. “It is another product we do not need. Bottled water companies are wasting resources and exacerbating climate change” (Neale). On a finite planet, it is senseless to invest in products that are energy inefficient.

Students for Environmental Awareness (SEA) is running a campaign to get plastic bags out of Rutgers facilities. Campaign Leader Ashley Sidhu commented, “Reducing plastic bag consumption at Rutgers University is the next big step for an already environmentally conscious school. Instead of forcing people to not use plastic bags at takeout or cafes, our goal is to transform students’ mindset in order to make more environmental conscious decisions, as well as promote a reusable bag alternative. Our actions have the potential to affect each and every student at Rutgers University, and it would most definitely be for the better”. The World Wildlife Fund estimates that 100,000 marine animals are killed from eating or being tangled in the 80 million bags littered annually. Only 10% are recycled where facilities exist (Cemansky). If the dining hall sit-in areas can go tray-less, the take-out areas should be able to go bag-less, or at least offer students paper or reusable bags. Students could be encouraged to bring their own reusable bag as well.

More than 90 universities, including Harvard and Brown, have banned the sale of single-use plastic water bottles on campus. California recently became the first state to ban the distribution of single-use plastic bags (Steinmetz). It is time for Rutgers to get these petrochemical products off their campuses. It is time to practice what we preach, for the sake of all the living beings of today and tomorrow.

Sources:
Response to a perceived risk is dependent upon how it is presented to those likely to be affected by it. Risk communication is a set of principles used by public health professionals and other emergency managers to provide information to individual stakeholders or communities so that they may make the best possible choices regarding the safety of themselves and their loved ones. In times of crisis, it is essential that emergency managers utilize effective risk communication strategies in order to minimize general disorder and fear resulting from natural human reactions to crises.

The current Ebola Hemorrhagic Fever (EHF) epidemic has proven to be the deadliest and widest-spread outbreak of the disease in the thirty-eight years since its discovery. The early notable outbreaks of the virus took place in the Democratic Republic of the Congo (then Zaire), a central African state, with initial incidents largely contained to the immediate area of origin by the seemingly impenetrable rainforest and quarantine efforts by the government and international aid organizations. The most recent outbreak has had a total of 10,141 documented cases in eight countries: Guinea, Liberia, Sierra Leone, Mali, Nigeria, Senegal, Spain, and the United States of America, two of which (Nigeria, and Senegal) are no longer affected by the disease.

The key difference to be noted between this year’s outbreak and past incidences has been the rate of infection in large urban areas as opposed to remote towns. The virus’ level of impact on West Africa has been dramatic and has prompted fervor in actively gathering resources to bolster threadbare health efforts in the affected states. Beyond the horrendous toll in human life, however, an equally disadvantageous effect of the outbreak has been the climate of fear that has been created in states across the world. Fear of the potential spread of the virus via international transit has become insidious, particularly in more-developed states, where health professionals and policy makers are scrambling to assuage the concerns of their frightened constituents.

In the United States, there have been four documented cases of infection, resulting in one death in Dallas, Texas, and the quarantining of numerous other individuals suspected of having come in contact with the virus. Despite this, communication of the risks of the disease has been mixed in efficacy, with speculation and incorrect reporting contributing to the general uncertainty and doubt in the efforts of policy makers and emergency managers. The Centers for Disease Control and Prevention (CDC) has clearly outlined both the definition of risk communication in the context of public health and clinical information about the virus, as well as best practices in handling cases of infection. The CDC is at the forefront of disease prevention and risk communication in the United States, yet despite all its resources and importance it has failed to adequately communicate the risks of Ebola and outline protocols to the public. The information is readily available on the CDC website, yet news reports have been rife with misinformation, evidence of a clear disconnect among the CDC, media sources, policy-makers, and the general public.

4,922 deaths from the disease have been confirmed, of which only one has expired in the United States out of the four total cases documented there. Despite this disparity in the number of Americans affected by this disease, congressional representatives have been debating fiercely over and calling for increased quarantine procedures and further isolationist policies. In addition, news sources such as Fox News, CNN, MSNBC, and other mainstream sources of American media have, rather than publish verified information or action plans designed by the CDC, been reporting
speculative and reactionary material that has only served to increase the public’s uncertainty about the disease and the steps being taken to prevent its spread. Speculation that EHF can be spread via airborne vectors, that it is a terrorist plot, and other unverified and/or blatantly false information has been propagated by news organizations that have repeatedly exhibited their penchant for sensationalism. This kind of behavior is detrimental to the overall well-being of the American people, and severely hampers efforts to better prepare communities for potential contact with the disease.

The Centers for Disease Control and Prevention possesses a wealth of constantly-updated clinical information about the virus, sets of best practices regarding its symptoms, containment, and treatment, and the resources to disseminate that information in a prompt manner, yet it has, as of yet, done little other than release comments on the practices of individual state governments in response to Ebola. In order to adhere to its own definition of effective risk communication, the CDC needs to be more vocal when presenting pertinent information to the public, who heretofore have been generally mislead both about the potential risks of Ebola infection in the United States and also about the actions of health officials and policy makers to properly prepare communities for that eventuality.

Given the current state of mainstream American news media, without such action it is likely that the fear-mongering and subsequent hysteria that have become hallmarks of its relationship with the American public will continue, and in this case have dangerous consequences for efforts to combat actual crises that may arise. Effective risk communication requires communication, and in the case of public health, requires unilateral and uninterrupted communication. The CDC is arguably the most powerful force in shaping U.S. response to issues of public health, and its level of participation in the dialogue concerning best practices between policymakers, health professionals, and the public will be the deciding factor if an Ebola Hemorrhagic Fever outbreak attains anywhere near the spread it has in West Africa. With debate still flaring over policies toward returning aid workers and soldiers from containment efforts in West Africa, it remains to be seen whether the CDC will move beyond its passivity and take a more active role in directing public health policy in the United States of America.


THE “AQUAMAN CRYSTAL”
By Chloe’ Lewis

The pursuit of scientific knowledge and dabbling into worlds and realities unknown has long since been a well-known aspect of human nature. Curiosity in the human mind is especially sparked in pursuit of the more fantastical ideas it conjures up. From the moment we became consciously aware of ourselves, our curiosities of the world around us in respect to ourselves was struck. We dream of flying. We dream of invisibility. We dream of teleportation. One of the most widely carried fantastical ideas is in the process of crossing the threshold from fantasy into reality. Scientists are working on developing a way in which humans can swim underwater without the need of oxygen. The material currently under development has been dubbed, the “Aquaman crystal”, and for good reason.

Scientists from the Department of Physics, Chemistry, and Pharmacy at the University of Denmark, Professor Christine McKenzie and postdoc Jonas Sundberg, have successfully synthesized a material that absorbs oxygen in massive quantities and stores it. This new material is crystalline. Using X-Ray diffraction techniques, these researchers have examined the chemical arrangement of atoms inside the material once it was filled with oxygen and when it was emptied of oxygen. This “Aquaman crystal” is even more unique, as the material can absorb and release oxygen many times without losing the ability to absorb oxygen further. This can be compared to dipping a sponge in water, squeezing the water out, and repeating the process. The oxygen can be stored until the user is ready to release it. A combination of low heat and low pressure releases the stored oxygen. It seems to only take a few grains of this crystalline material to allow for a single breath underwater.

The major key component of this incredible crystal material is the existence of cobalt, which is bound in a particularly designed organic molecule. The cobalt gives the new crystalline material precisely the molecular and electronic structure required to enable it to absorb oxygen from the environment. This absorbance-release mechanism is far from new to science. All breathing terrestrial life no earth require iron as the major key component for their breathing; certain terrestrial animals require copper to fill that role. In contrast, aquatic life requires cobalt to allow for underwater breathing.

Aside from fulfilling the popular human fantasy of diving into a large body of water and being able to breathe underwater on a whim, science can use this ground-breaking research to serve the greater good of the dimmer realities of the human world. This new material could be valuable for lung patients having to carry heavy oxygen tanks with them, for divers, and an array of professions from scientific research to the Olympics. The possibilities are endless. Perhaps this research, and ground-breaking findings of the like, can, in a positive light, blur the lines of longstanding human fantasy and dimmer realities of daily human existence. More research on the subject is underway, and scientists remain hopeful that this new discovery can prove useful to mankind in many aspects of life.

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PUMPKIN SEASON IS HERE!

By Chris Wilson

The hot, suffocating air that is so characteristic of the New Jersey summer has dissipated, only to be replaced by the crisp and refreshing autumn season. For some, this seasonal change only signals the beginning of the cold winter months and is thus met with a sense of dread and despair. For others, like myself, autumn is a celebration. It allows us to gather in our homes, hot apple cider in hand, and enjoy the warmth and comfort of friendship that is so juxtaposed by the weather outside. It also gives us a chance to see some of the most fantastic natural phenomena on Earth, like the changing of the leaves on the trees. Our streets, parks, forests, and homes have become magnificent collages of reds, yellows, and oranges as the trees prepare to hibernate for the winter months. The frantic, last-minute winter preparations of the thousands of squirrels and other creatures also begin in earnest. The birds, too, have begun to leave *en masse* with thoughts only of the warmth in the south. We witness their great migrations, particularly in New Jersey, and marvel. I graciously welcome every part of autumn and consequently take part in the many celebrations and traditions that have become popular throughout the years. One of these traditions, thankfully, has increased in popularity in New Jersey ever since it began in the 1800’s: pumpkin picking.

Pumpkin picking in New Jersey has become a multimillion dollar industry, and as such, has provided NJ farmers with a great fall bonus to their businesses. The associated pumpkin picking festivities, such as hay rides, corn mazes, and pumpkin recipes and crafts, add to this bonus while simultaneously providing a great family and community experience. There are many popular places to go pumpkin picking in New Jersey, like Ort Farms in Long Valley, where they boast an 863-pound pumpkin this year, or Norz Hill farms in Hillsborough, where they advertise 75 different types of pumpkins, squashes, and gourds. The pumpkin picking industry in the United States has skyrocketed in the last 15 years, topping out at $150 million a year. New Jersey is in the top ten producers of pumpkins in the U.S., with acreage rising by a larger percentage every year. Beyond the act of picking the pumpkins themselves, these millions of pounds of pumpkins are put to a variety of uses, from decorations like jack-o-lanterns and painted gourds, to thousands of recipes like pumpkin cider and pie.

Gutting and cutting a pumpkin has twofold benefits. One, you get the tasty seeds to roast and season, and two, you get a beautiful, artistic lantern to display. The typical jack-o-lantern lasts about 10 days, depending on how cold it gets at night, and can liven up a stoop, window, or yard with festive cheer. Designs for your carving are limitless. There are hundreds of thousands of stencils to choose from online, or if you are feeling adventurous you could freehand it with a carving knife and hope for the best.
For the best jack-o-lantern experience, I would recommend looking for a pumpkin festival. The biggest of them is in Keene, New Hampshire, where over 20,000 jack-o-lanterns are put on display. I traveled to Keene last year to witness this festival firsthand and it is incredible. Jack-o-lanterns are everywhere. All along the main street, pumpkins were displayed on shelves 8 feet high. The pumpkins littered the ground along the curb and filled up the shop windows along the main street. At the very end of the road sat an enormous scaffolding that displayed hundreds of jack-o-lanterns burning brilliantly against the sky. There were thousands of designs, some amateur and some professional, but all in all the effect was startling. Vendors lined the streets, selling their pumpkin and Halloween related paraphernalia. Pumpkin flavored candies, pumpkin pies, pumpkin seeds, and various other treats were being eaten by the masses. The celebration lasts the whole night, and as Keene is a college town, quickly becomes a large party.

Pumpkins are a huge part of autumn and provide millions with fun, delicious activities that bring us all together before we brave the winter months. Halloween and Thanksgiving break up the relative monotony of daily life in the fall chill, and give us something to look forward to before the darkness and general solitude of winter. Autumn will always be a special and unique experience, particularly in New England, where the trees dazzle us with their colorful transformations and the birds migrate in the millions to warmer climates. Though some days I may look longingly after a flock of departing birds, envious of the warmth that awaits them at their destination, I know that the cold is worth it. Our traditions and culture have embraced autumn as the celebratory last harvest before winter, and for that I am grateful.

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Plastic Pollution: A Threat to Freshwater Ecosystems
By Collin Dobson

It is no secret that the world’s oceans are being polluted with plastic waste at an alarming rate. Current estimates are that 90% of the trash currently floating on the ocean’s surface is made up of plastic waste. The total breakdown of plastic materials in the ocean can take anywhere between 500–1000 years. Larger pieces of plastic are broken down into smaller pieces via wave action and sunlight, but do not disappear completely. Instead, they exist as floating microscopic pieces of plastic and accumulate near the ocean’s surface. Micro-plastics in the ocean also originate from the production of cosmetic products and household cleaners.

Micro-plastics can be harmful if ingested by marine organisms, as they are not physiologically capable if digesting them. Approximately 100,000 marine mammals and over one-million seabirds die each year from either ingesting or being tangled in plastic. Fortunately, in recent years a large amount of awareness has been raised regarding the amount of plastic pollution in the ocean. Most have been made aware of the large patches of “plastic soup” that accumulate in ocean gyres, and the Great Pacific garbage patch.

It is popular belief that the majority of plastic pollution would eventually reach the ocean and then begin to break down into smaller pieces. However, it turns out that plastic pollution is not limited to the ocean and it can also be a threat to freshwater ecosystems. A team of researchers from McGill University, Quebec, have discovered micro-plastics in the sediment of the St. Lawrence River, marking the first time that these pollutants have been found in freshwater ecosystems. Sediment samples were collected from the river and the micro-plastics were counted under a microscope. Some of these samples included over 1000 micro-beads of plastic per liter of sediment, which is a concentration close in magnitude to the most contaminated ocean sediment found to date.

The study supervisor, Professor Anthony Ricciardi on these findings: "It was previously assumed that floating micro-plastics are flushed through rivers to the sea. Now we have evidence that rivers can act as a sink for this pollution." If rivers and other freshwater bodies of water are acting as sinks for micro-
plastic pollution, then the organisms that inhabit these environments could be at risk.

According to recent research at Wageningen University, Netherlands, freshwater organisms can be negatively impacted by the presence of micro-plastic particles in their environment. In their lab experiments, PhD candidate Ellen Besseling and student Bo Wang, exposed water fleas to varying levels of micro-plastics. The findings of this research determined that micro-plastic particles were shown to create deformities in water fleas, slow the growth rate of algae, and impede communication between small fish.

These results are concerning for a few different reasons. First, if micro-plastics are able to slow the growth rate of algae then micro-plastic pollution could impact any freshwater organisms that consume algae as a food source. Second, many fish rely on communication tactics to avoid predation. If micro-plastic pollution can impede communication between fish, then it could certainly cause some to be at a higher risk of predation. Lastly, if micro-plastic pollution can create deformities in water fleas, then there is a good chance that it can also create deformities in other freshwater organisms. Potential impacts of deformities in organisms include stunted growth, limited reproduction, and death.

Fortunately, there is a silver lining within all of this and it is that plastic pollution in marine and freshwater ecosystems is completely preventable. Therefore the negative effects that micro-plastics can have on marine and freshwater organisms are also preventable. We need to do our part to make sure that plastic does not end up in the oceans, rivers, streams, and lakes of the world.

Sources:

Each year the US Environmental Protection Agency (EPA) releases a report on America’s Municipal Solid Waste (MSW), better known as trash or garbage. The most recent report in 2012 showed the US generated a total of 251 million tons of MSW; that’s 4.38 pounds of waste generated per person per day. For the average person, the kitchen trashcan is the last they see of their waste – however the life cycle is not nearly completed. A complex web of waste management systems takes over and redirects the trash to one of several possible end uses. Unfortunately, the US system of waste management is fragmented and unsustainable. The majority of America’s waste, 54%, ends up in landfills. Only 34% is recovered via composting and recycling, the remaining 12% is combusted for energy recovery. The best option, according to the EPA’s waste management hierarchy, is source reduction and reuse. Waste generation is inevitable, thus we must look toward a system that encourages source reduction but also discourages landfilling and incineration. A large majority of US MSW consists of compostable materials such as food waste (14.5%) and yard trimmings (13.5%); if you include paper and cardboard (27.4%) the amount of organic material increases to a total of 55.4%. Our MSW also contains a large portion of plastics (12.7%). A majority of plastics and organics end up in landfills, however both can be better utilized using more advanced technologies, such as pyrolysis, gasification, and anaerobic digestion. These innovative technologies can use waste products as feedstock for bio-chemical and thermochemical energy conversion to manufacture advanced low-carbon liquid fuels.

These advanced fuels are second generation fuels that come from renewable sources and remain less carbon-intensive than the petroleum-based fuels that currently dominate the liquid fuel transportation infrastructure. According to the Energy Information Administration, liquid fuels are projected to increase in demand and remain the most consumed fuel type for the next thirty years. The transportation sector relies heavily on petroleum-based liquid fuels and as a result, is the sector that emits the most greenhouse gases. Moreover, advanced low-carbon fuels are imperative for the world to transition from carbon intensive societies to ones based on sustainability.
Plastics are one way to illustrate how this transition is possible. In 2012, Americans generated 31.75 million tons of plastic waste, of which 8.8% was recovered via recycling; the remaining 92.2% was discarded in landfills or incinerators. Not all plastics are recycled; in fact, a majority of plastics are not due to economic viability and operational feasibility. Plastics take hundreds of years to biodegrade and when they do, many release a harmful chemical called Bisphenol A (BPA). Landfilling is not a sustainable option for plastics, yet it remains the primary method of plastic waste disposal. Another option is incineration, or waste to energy (WTE) as it is often referred to, which uses combustion of waste to generate energy that can be transferred to the power grid. While this diverts plastics from landfills, the generally inconsistent composition of plastic waste prevents optimized energy recovery for incineration. Materials like plastic can be better utilized in advanced technologies for waste to energy such as pyrolysis, which uses thermochemical conversion to manufacture advanced low-carbon liquid fuels.

We must remember that popular renewables such as solar and wind energy are not silver bullets. Emerging technologies such as pyrolysis, gasification, and advanced anaerobic digestion systems can supplement the more common set of renewables while addressing sustainability issues in the areas of waste management and liquid fuels.

Sources

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In an attempt to improve transportation infrastructure, the new New York bridge project was started in 2012 to replace the outdated Tappan Zee Bridge. Concerns about the weathering Tappan Zee Bridge began around 2000 when a state task force recommended that the bridge be replaced. New York State Governor Andrew Cuomo fast-tracked the plans that were delayed by nearly a decade. Key features of the plan include goals of longevity and durability, an estimated contractor’s budget of $3.9 billion, and plans to finish construction by 2018 to replace the current bridge. These are positive elements of the plan but the lack of a ‘Tappan Zee Tolls and Financing Task Force’ concerns critics of the project who worry that there is a lack of transparency and still no task force after two years. Governor Cuomo had plans to create the task force in 2012 but has yet to take action on this plan. The lack of transparency and the delay in the task force’s creation is raising concern in the public eye.

The concern about the funding behind the new replacement for the Tappan Zee Bridge, which opened in 1955, is legitimate since the bridge is in need of replacement. After the old Tappan Zee was first constructed, the surrounding areas saw explosive growth as the population doubled in some areas such as Rockland. But now, the bridge is unable to handle the daily volume of traffic. As a major route of travel, the Tappan Zee Bridge now faces routine congestion and a consistent need for maintenance. The Wall Street Journal also posits the concern among tollpayers about a rise in the toll fare because of the Environmental Protection Agency’s rejection of a plan that would have taken money from statewide clean water initiatives. To fund the project, Governor Cuomo’s administration applied for nearly half a billion dollars in loans. However, the loans that would be tapped are funds intended for clean water initiatives through the Clean Water State Revolving Fund. Rejecting the plan, the Environmental Protection Agency (EPA) considered the project ineligible for the loan stating that the purpose of the fund is “not for the mitigation of impacts directly caused by major construction projects.” Governor Cuomo has made it clear that the bridge’s construction will continue even if the loans are not approved.

The Clean Water State Revolving Fund, abbreviated to CWSRF, is a program that started in 1990 with the intent to provide affordable financing to improve sewage systems and wastewater treatment facilities. The CWSRF is jointly overseen by New York State’s Environmental Facilities Corporation (NYSEFC) and the New York State Department of Environmental Conservation (NYSDEC). The program states their purpose on
their website as:

“The CWSRF provides low-interest rate financing to municipalities to construct water quality protection projects such as sewers and wastewater treatment facilities. A variety of publicly-owned water quality improvement projects are eligible for financing. Eligible projects include point source projects such as wastewater treatment facilities and nonpoint source projects such as stormwater management projects and landfill closures, as well as certain habitat restoration and protection projects in national estuary program areas.” (2)

There is no mention of projects that involve or relate to water activity such as that of the bridge’s construction.

Joan Matthews acts as director of the EPA’s Region 2 Clean Water Division and addressed a letter to the NYSDEC’s Commissioner, Joseph Martens, and to the NYSEFC’s President and CEO, Matthew Driscoll in which she states that “construction activities arising from transportation projects do not advance water quality, and CWSRF funding should not be used for these purposes.” The letter also says that five of the twelve projects will be considered, however, because they do relate directly to the bridge’s construction and are included as actions of one of the federal implementing programs, the Final Comprehensive Conservation and Management Plan (CCMP). The other projects were rejected due to their nature and direct involvement with the construction. These plans aside, the project has already been approved to receive a $1.5 billion loan through the Department of Transportation’s Transportation Infrastructure Finance and Innovation Act.

Although there is support for the bridge and the progress it will bring, the concerns about funding sources are clear. Governor Cuomo and his administration will appeal the EPA’s rejection of the plan so as to reduce the environmental impact of the project, but he claims that the project will continue with or without the funds.

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California Drought

By Ryan Koch

California, the nation’s most populous state, with 38 million people, has been experiencing an unusually long drought. In fact, these have been California’s driest conditions on record. Droughts are very common in this state, but there are no recorded droughts lasting more than three years. The current drought is pressing into its fourth year, and is at its hottest. In a normal year, California receives roughly 20 inches of rainfall, yet within the past year, it has only received three. California residents and the economy have taken a major hit as a result. A large portion of the nation’s produce, including strawberries, raspberries, blackberries, and other vegetables, come from the Pajaro Valley. In order to save the dominant agricultural industry, serious action must be taken with regards to the state’s water infrastructure.

The current water distribution system is comprised of several dams, pipes, and canals that transport water to cities and farms. This system has been effective overall over the past 90 years. However, this system was designed to support the needs of the population at that specific time. With the recent spike in temperatures, population increase, and lack of precipitation, California’s water infrastructure is falling behind.

Certain strategies are currently being explored to help this dire situation. The first strategy is to spend and build more on infrastructure. Governor Jerry Brown is in the process of approving a $7 billion plan that would create two new reservoirs and expand dozens of others. This method will rely on rainfall, thus it will not be a viable strategy by itself. The second strategy, known as “Showers to Flowers,” will capture a city’s storm and waste water and pump it back to farmers. The system currently in place transports waste water to Monterey Bay and pumps seven million gallons of water per day. The state drought relief money will be used to expand the “showers to flowers” program and will prevent farmers from pumping more water from the ground. The third strategy is a management practice, and will cut freshwater use by 20% in the next three years. The mayor of Los Angeles, Eric Garcetti, also aims to fix faulty plumbing systems that lose an annual 15% of water. These strategies may be the only ways California will cope with the drought.

New studies linked the California drought to the effects of climate change. Research scientist Noah Diffenbaugh stated, “Extreme atmospheric high pressure in this region – which is strongly linked to unusually low precipitation in California – is much more likely to occur today than prior to the human emission of greenhouse gases that began during the Industrial Revolution in the 1800s.” In other words, humans may have indirectly created this drought, and humans will have to find a solution for it.

http://mashable.com/2014/08/14/california-drought-worst/
According to the National Oceanic and Atmospheric Association (NOAA), marine protected areas restrict human activity to some extent for conservation purposes. The responsibility of managing established marine protected areas (MPAs) varies from local, state and federal governments and each MPA can vary in terms of the extent to which human activity is limited. These protected areas provide a wide range of benefits to the natural environment including enhancing biodiversity, invoking habitat recovery, providing protected areas for fish to spawn and larvae to grow, and acting as a safe haven for endangered species. A well-managed and successful MPA will provide, in return, improved fish capture, resiliency and natural protection from climate change impacts, and support from local communities that are intricately linked to the marine environment.

As of this past year, more than 6,500 MPAs have been established, encompassing 2.09% of the world’s oceans. Of these protected areas, 0.83% include specified no-take zones, which are the most rigid restrictions on human activity [4]. In “no-take” designated areas, any type of extractive activity is prohibited. This includes everything from fishing, drilling, mining, hunting, and logging to something as seemingly benign as shell collecting.

Last month, the Obama administration announced the expansion of the Pacific Remote Islands Marine National Monument around U.S.-controlled islands and atolls in the central Pacific. The newly expanded area is currently the largest marine reserve in the world, covering 490,000 square miles[1]. Commercial fishing, dumping, and mining will be prohibited in the protected area, but recreational fishers and boaters will continue to be permitted. According to the Obama administration, "expanding the monument will more fully protect the deep coral reefs, seamounts, and marine ecosystems unique to this part of the world, which are also among the most vulnerable areas to the impacts of climate change and ocean acidification."[1] Species believed to be protected by this action include sharks, seabirds, and sea turtles, manta rays, sooty terns, and coral reefs. Secretary of State, John Kerry, admitted that enforcing the fishing bans in the monument will be a challenge and one that may be alleviated by the implementation of the Port State Measures Agreement. This is an international treaty necessitating member nations to prevent the sales of illegally caught fish on the market. Unfortunately, at least 25 nations must sign the treaty before it can go into effect, and currently only eleven have ratified it.

Across the Pacific, the small island of Palau recently made the impressive achievement of fundraising $53,000 through a crowdfunding campaign called “Stand with Palau”. All of the funding will go towards the transformation of their territorial waters into no-take marine protected areas. The new sanctuary will cover over 230,000 square miles, which is roughly the size of France[2]. Daniel Kachelriess, the outreach coordinator for the Stand with Palau campaign, is mindful of the potential stress on a nation’s finances in establishing and run-
ning a marine protected area. Although the amount raised is not extremely substantial, it will “…directly support the implementation of the [Palau] National Marine Sanctuary…especially in regard to data collection, monitoring and enforcement framework and making sure the marine sanctuary is implemented in a way that is on the medium term economically and environmentally sustainable,” [2]. The waters surrounding Palau host over 1,000 species of tropical fish and a large network of coral reefs, which will substantially benefit from the marine no-take zone.

Ambitious environmental projects, such as the creation of marine protected areas, require a staggering amount of funding, and the benefits are difficult to predict. It is significant to understand what makes a MPA effective in order to promote conservation efforts and persuade nations to continue creating and expanding them. A team of researchers led by Graham J. Edgar from the University of Tasmania made efforts to assess what observable impacts constitute a successful marine protected area. Several of the MPAs established today are nothing more than “paper parks” – On paper, the areas are protected, but they lack the funding and manpower to enforce the rules against illegal extractive activities. In addition, marine ecosystems are so intricately connected that harmful harvesting practices occurring beyond the boundaries of the protected area inhibit the MPA from reaching its full potential. Edgar’s survey identified five key features that interact and influence the success of an MPA: the degree of protection, the level of enforcement, how long the MPA has been in existence, the size of the MPA, and the degree of isolation from heavily fished areas. The team looked at how biomass, abundance, and diversity of species varied among 87 MPAs around the world, and concluded that when the areas had a combination of these five features, the conservation benefits increased exponentially. The most successful MPAs were all no-take zones, well-enforced, more than ten years old, over 100 square kilometers large, and isolated by deep water or sand. MPAs with three or less of these key features appeared to have no value for conservation. Of the 87 MPAs that the team surveyed, only four possessed all five key features[3]. Due to conflicting interests, the lack of funding and manpower, acquiring the five factors seems like a daunting and almost impossible task. However, raising more awareness and educating the global community on restorative benefits by marine protected areas, their creation and management can become prioritized on the political agenda.

Sources:
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Climate change impacts become visible as natural disasters and other environmental stressors periodically test the resiliency and vulnerability of areas. Some of New Jersey’s counties are known to be high-risk areas due to hurricanes, flooding, and other natural events, thus increasing resiliency within these communities needs to be a priority. Effective resiliency depends upon our understandings of the human-environment relationship in which the two parts achieve stability through direct interaction between one another. The two systems are directly correlated and respond through negative and positive feedbacks, thus our mitigation and adaptation strategies need to consider our impacts on the environment in order to decelerate the impacts of climate change.

In order to build resilient societies, human-environment relationships should be less damaging on both ends, which in this case the first step on our end is to focus on efficiently decreasing greenhouse gas emissions. In New Jersey, there is an existing resource that can be utilized for clean energy and fuel as an alternative to fossil fuel consumption. Food waste can be sustainably used as a feedstock for anaerobic digesters to generate biogas. The food waste in NJ is reported to be around 9,907,342 tons, which is about 15% of the total municipal solid waste generated. The food waste in landfills contributes to methane gas released into the environment. Despite the fact that methane has a shorter cycle than carbon dioxide, it is more efficient at trapping radiation, thus methane gas is a large contributor of climate change. Landfills are the third largest source of methane emissions in the U.S, and the emissions can potentially be lowered if source separated food waste is diverted to technology as anaerobic digesters. Anaerobic digestion (AD) is an efficient, controlled and closed system that breaks down the organic feedstock, which in this case is food waste, in order to generate biogas as a possible energy source. It is an effective system that reduces anthropogenic causes of methane production such as from industries and landfills. If ADs were incorporated into counties, or even residential homes, institutions and businesses at the local level, we would develop mitigation and adaptation strategies that not only benefit our side of the relationship but also the environmental side.

Using food waste as a viable feedstock for clean energy will provide better waste management outcomes than landfill disposal and aerobic composting. This potential solution could also foster economic growth within communities by creating green-collar jobs and by introducing a new source of energy and fuel into our markets. It would better air quality, lower greenhouse gas emissions and improve human health by depending less on fossil fuels as an energy source. The benefits of utilizing food waste as an energy source seems like a viable solution, but why is it so difficult to push forward and implement.

Firstly, an anaerobic digester is extremely costly for counties to install and maintain, thus sufficient funding from local governments and municipalities would be necessary. For short-term analyses, it seems that the costs for installing ADs will exceed the benefits; however, it is quite evident that long-term benefits for environmental and human health will exceed the installment and maintenance costs. Secondly, we will need to garner more public support and participation in food source separation for this to all work. The AD will only work if there is enough food waste generated and source separated, thus individual behavior is an important aspect as well. Could food waste separation become a daily practice of ours in schools, restaurants, hotels, hospitals, and in our homes? It is not just about the cost of the technology, it is whether our society is ready to develop such practices that support the development of new sources of energy. Could we see this happening in 20, 30 or 50 years? We are already seeing the adverse impacts of fossil fuel consumption on a global scale, thus local and federal support is necessary for projects developing alternative energy.

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Generally, it seems rare to hear positive news from any media source about environmental issues. We hear about the tons of carbon emissions released, the impact of excessive waste and energy, and factories leaking waste into a local water streams. However, the United Nations headquarters released a report last month that turned a new leaf—the hole in the ozone layer shows major signs of recovery. In fact, it is expected to shrink within the next decade. Evidence reveals that the Montreal Protocol, enacted around 30 years ago, is aiding environmental progression (NOAA).

The findings uncover that the ozone layer is thickening and the ozone hole over the arctic has stopped growing (BBC). It stated that the ozone levels are expected to reach “benchmark levels” set in 1980 (before there was significant ozone damage) by 2050 (NOAA) and that the hole is actually expected to shrink sometime around the next decade (BBC). The volume of most of the ozone-depleting substances have dropped since the last assessment in 2010 (NOAA). Although the predictions of recovery are based on compliance with international standards, it seems conditions will continue to improve.

For several decades, the World Meteorological Organization and the UN Environment Programme have studied the ozone layer, its recovery, and the connection between that recovery and international policy. The Montreal Protocol was an international treaty originally signed in 1987 (although it has been substantially amended) and its purpose is to “stipulate that the production and consumption of compounds that deplete ozone in the stratosphere—chlorofluorocarbons (CFCs), halons, carbon tetrachloride, and methyl chloroform—are to be phased out by 2000 (2005 for methyl chloroform)” (CIESIN). Some scientists believe that these recent findings about the ozone hole are directly related to the international efforts put forth in order to maintain the integrity of the Montreal Protocol (Washington Post).

There is still research that needs to be done on the actual recovery of the ozone, but scientists perceive the results to be substantial. It reveals global dedication to an environmental cause. Could this be the next step in battling climate change? WMO Secretary-General Michel Jarraud states “international action on the ozone layer is a major environmental success story... This should encourage us to display the same level of urgency and unity to tackle the even greater challenge of tackling climate change” (BBC).

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Ecological Impacts of Recreation

By: Jamie LaVergne

Autumn is a beautiful time for all kinds of outdoor activities, whether you enjoy hiking, camping, canoeing, or kayaking. Though many people profess a love of nature and outdoor recreation, some may be surprised of the detrimental effects that their seemingly innocuous activities can have on the environment. Throughout the world, nature preserves and parks depend heavily on revenue generated by visitors, but it can be these same visitors that pose dangers to the "protected" wildlife.

The recreational habits of park visitors affect both the environment and the life therein. In a study of Jiuzhaigou Biosphere Reserve in China, tourism and the heavy use of hiking trails was found to be directly related to erosion along the length of the trail, the deepening and widening of the track, and even deterioration of the trees from root exposure (Li, Ge, and Liu, 2005). As we trample the tree roots, brush, and undergrowth, it cuts into the preferred nesting sites of several species and directly damages flora. Deepened paths can collect rainwater like a drainage ditch, which furthers erosion and drowns plants that attempt to take root along the damaged ground. These issues of trampled flora and fleeing fauna are not by any means limited to one location. Roots exposed along trails in the Italian Alps were subjected to dendromorphological surveys and were found to have exhibited abnormal widening and stunted growth, particularly in the time closely following initial exposure (Pelfini and Santilli, 2006). The researchers attribute this to trampling and erosion caused by heavy usage of the trails by hikers.

The effects of recreational usage of parkland are not limited to the damage of local flora. In one particular study out of Fort Collins Colorado, there are several examples of visitor influence on wildlife including flushing of larger species such as pronghorn antelope and male deer from areas near the trail when hikers or mountain bikers used the paths (Taylor and Knight, 2003). In one particular case, an entire island within the parkland was found to be potentially unsuitable for wildlife due to heavy usage. However, the same study found that roughly half of the visitors surveyed had no concept of the effects of human interaction on wildlife or of the potential environmental stresses involved. In fact, many perceived there to be no issue with directly approaching wildlife (Taylor and Knight, 2003). Such encroachment causes undue stress to the animals, and can effectively chase animals from their previous habitats as they seek to avoid interaction.

Whether it is ungulates in Colorado, China, Italy, or even grouse along the ski slopes of Germany (Thiel et. al., 2008), the environment experiences high stress as it comes into contact with human uses. This can be psychological stress to fauna or physical stress to both plant and animal life, thus it presents a threat to the success of those species most exposed.

What can be done to reduce these effects? In the case of erosion in the Jiuxhaigou Reserve, elevated and artificial paths proved effective at limiting some of the effects of erosion from footpath usage (2005). Taylor and Knight suggest in Colorado that education for visitors on the potential impacts they may impose on wildlife could lead to more responsible and potentially less intrusive use of park land and trails (2003).

Exercise and fresh air through woods and parks are desired activities within our society; however, we must be aware of the negative impacts we may impose on the environment. Through the consistent maintenance of trails, educative programs and the continuous efforts of public land managers, park rangers, and other personnel, could foster the development of a more positive interaction between wildlife and visitors.

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Cleaning Up Our Acts

By Sagarika Rana

Sweden has been recycling its trash so efficiently that currently up to 99% of normal household trash is completely recycled. This is a huge improvement, considering that at one point in 1975, only about 35% of household waste recycled. In 1999, Sweden enacted “The Swedish Environmental Code”. This code gave a clear outline of what the government of Sweden should abide by in making decisions for present and future generations. Sweden is thinking about politics in terms of sustainability and a brighter future. This positivity about recycling helps people in the country to continue doing think more sustainably and consider future generations as well. How exactly does the government promote such a positive attitude about recycling?

The availability of recycling stations (typically by law, no more than 300 meters from residential areas) makes recycling extremely easy with very little effort needed. The use of stationary vacuum systems in local areas allow for minimal recycling effort. Stationary vacuum systems are comprised of underground pipes that transport and vacuum seal recyclable waste. I have saved plastic bottles I have used at Rutgers to bring home because I could not find a recycle tin nearby, or the one I did find was full. This system around campus would be amazing, since there would be no need for cleaning or transportation of garbage. With innovative systems like this, it really is no wonder Sweden is doing so well.

“The use of land, water and the physical environment in general is managed well in the long term in regards to ecological, social, cultural”; and “the economic values and valuable natural and cultural environments are protected and preserved” are two parts of Swedish Environmental Code that could have been enforced here in the U.S. to prevent the drought in California that occurred earlier this year. This group oriented thinking, “the caring” that goes into recycling, would help tremendously here in the U.S. or even on a smaller scale, like college campuses. In 2011, alongside with the Swedish Environmental code, the government passed a new strategy that supported environmental technology-oriented companies the backing they need to succeed. This strategy had three main points that would make it easier to commercialize innovations: to promote research in environmental technology, to promote environmental technology, and to promote the export of this technology, which would result in more funding for research.

America, on the other hand, does not have any federal laws on recycling. Instead, we call on state legislation and local support to fuel the public’s drive to recycle. In America, the average person generates 4.5 pounds of trash every day and about 1.5 tons of solid waste per year. In 2009 Americans recycled 82 million tons of materials and the resulting CO2 emission reduction is equivalent to taking 33 million cars off the road. If we were talking about what we can do to minimize our waste like Sweden, new laws and strategies would be amazing. Implementing the vacuum system and having more available options to recycle would greatly improve the waste management efforts in country. The recycling industry has great potential to thrive if collective attention and effort are given to the issue.

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Deep in the Gulf of Mexico, residing in an underwater canyon off the Florida Panhandle, lives a population of about fifty Bryde’s whales. Bryde’s whales are a species of baleen whales named after the 19th century Norwegian whaler, Johan Bryde. Although other species of baleen whales visit the Gulf, this population of Bryde’s whales are the only members known to stay in the area all year round.

Bryde’s whales typically grow to lengths of thirty-nine to forty-five feet, weigh up to fifty thousand pounds, and are similar in appearance to sei whales. They can be found worldwide in tropical and subtropical latitudes. The global population of Bryde’s whales is still a hot topic of research in the marine science field, as they were only differentiated from Eden’s whales, an entirely different species, by researchers in 2003. Because this discovery was made relatively recently, scientists are still unsure about the size of the worldwide population of Bryde’s whales, along with other information such as their average lifespan. Although this research has been ongoing for years, an extremely interesting finding came to light in an article published by the National Marine Fisheries Service (Rosel and Wilcox, 2014) this summer. A series of genetic testing and DNA sequencing discovered that these mysterious whales in the Gulf might be a subspecies of the Bryde’s whale, or even a new species entirely.

Further research will be performed, but if this finding is true, these fifty unique Gulf whales have a shockingly small population. Michael Jasny, director of the marine mammal program of the Natural Resource Defense Council (NRDC Petition), believes that these whales may be “the most endangered species of whale on the planet”. In response to this new finding, the NRDC has submitted a petition to the United States government to list the Gulf of Mexico Bryde’s whale as endangered under the Endangered Species Act on September 18th, 2014. The petition explains, “The study found that the Gulf of Mexico’s Bryde’s whale population has little genetic diversity, suggesting a small population size and a history of isolation; and that the population is evolutionarily distinct from all other Bryde’s whales examined to date” (NRDC). In addition to being genetically distinct, the species also exhibits different behavioral traits than other known species of Bryde’s whales.

For an incredibly endangered species, the Gulf of Mexico is certainly not an ideal habitat. Because the Gulf’s waters are heavily industrialized, marine species that call the Gulf home face a variety of environmental challenges. For example, vessel collision, oil and gas exploration, commercial shipping, and bioaccumulation of organic pollutants are only some of the environmental issues currently present in the Gulf of Mexico. In addition, long-term effects of the Deepwater Horizon oil spill are still being studied. The NRDC’s petition warns, “The population’s extremely small abundance, its low genetic diversity, its apparent limited range, and its exposure to numerous anthropogenic threats leave it highly vulnerable to extinction” (NRDC Petition).

Undoubtedly, marine scientists will continue to explore this enigmatic new species and the consequences of industrialization in the Gulf of Mexico. Listing the Gulf of Mexico’s Bryde’s whale as an endangered species, however, will certainly be a start to conserving marine biodiversity. If you are interested in learning more, the NRDC’s petition, which is available as an online PDF, provides a plethora of information about the species, along with an exhaustive list of scientific studies about the Bryde’s whale and industrialization in the Gulf of Mexico.

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All it takes is one news article with the words “the size of a puppy” with a picture of a spider (mankind’s greatest collective fear) for an article to be covered by every news outlet in existence. The article has gotten so viral that there’s now a page for it on Snopes, a website that debunks rumors and strikes down over-exaggerated claims. So, Snopes, surely you can shed some light on the situation and alleviate our fears from what is surely a hoax article?

Or you can make me never want to leave my house again. Thanks, Snopes.

The goliath bird eater (scientific name: Theraphosa blondi) is indeed a real creature that can reach a leg span of 11 inches (!) and have a body “about the size of a large fist,” according to National Geographic. This terrifying tarantula crept its way into news headlines (and our nightmares) on October 17th, when entomologist Piotr Naskrecki’s recent photos of the monster were published on LiveScience.com, and later went on to be covered by basically every news outlet imaginable. Naskrecki accounts his encounter with the animal by remarking on the noises it was making, which turned out to be its footsteps; the animal hunts in the leaf litter on the forest floors in the rainforests of South America, where its large weight and hard feet make its steps sound like “small hooves”, according to Naskrecki. While tiny horses would be a different kind of terrifying in and of itself, the animal we’re talking about here have 1-1.5 inch fangs, and while their venom isn’t deadly to humans, being stabbed by a 1.5 inch fang still really hurts. But, since tarantulas only bite in self-defense, it’s quite rare that a tarantula (or any spider, really) would ever bite a human.
It’s interesting to note our general mentality toward spiders as a society. This article made sensationalist headlines everywhere because it’s a “scary” concept to have spiders be that large. Although we’ve known about goliath spiders for a few years now, the pictures Naskrecki took were really what made the article take off in headlines. Most Americans have the mentality that insects and arachnids are so far below us that killing them is completely benign in the grand scheme of things, which starts to get fuzzy when they get to “not easily killable anymore” sizes. It’s this fear of not being able to dispose of a common household terror easily that makes these monsters so scary, but I believe we’re thinking about it the wrong way. It’s strange that if a squirrel or a raccoon got inside a home, they wouldn’t be put on the instant kill list, and yet spiders are seen as dangerous and disgusting vermin.

About two people a year worldwide die from spider bites. They typically only eat insects with rare exceptions; in fact, the goliath birdeater itself eats primarily earthworms. Is it terrifying to look at? Sure, something with 8 eyes and 8 legs that fuzzy just unsettles us—but it’s not fair to discriminate against spiders as a whole because of our silly dispositions. I’m arachnophobic, but I’m taking steps to allow spiders to live in the same plane of existence as me because I respect them.

Because I am terrified of them.

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Women like Rachel Carson and Jane Goodall, celebrated matriarchs of the environmental movement, founded a legacy of powerful female environmental leaders. By not only breaking into, but expanding their fields beyond any previously conceived limits, these women made inroads for female scientists, and showed the world that the story of modern environmentalism would forever be characterized by potent female leadership. Today, Rutgers professor and alumna Dr. Brooke Maslo carries on this legacy of leading female environmentalists through her recognition as honoree of the 2014 Women & Wildlife Awards.

The Women & Wildlife Awards are an annual event hosted by the Conserve Wildlife Foundation of New Jersey, created to “celebrate and recognize outstanding women for their achievements and advances in protecting New Jersey’s endangered and threatened wildlife species.” Each year, four female conservationists working within the state of New Jersey are recognized in the categories of inspiration, legacy, leadership, and education; Dr. Brooke Maslo was this year’s honoree in education. Maslo first came to Rutgers as a graduate student in the department of Ecology, Evolution, and Natural Resources. Following the completion of her degree, Maslo spent time as a Research Specialist in the Center for Urban Restoration Ecology, before stepping into her current role as professor of Wildlife Ecology and Conservation and Animal Behavior.

Dr. Maslo’s recognition as one of the state’s leading conservationists comes from her extensive research on threatened species and her outside-the-box methods of engaging her students. Defining her work as both theoretical and applied ecology, Dr. Maslo has spent over a decade studying the piping plover, a small and charismatic shorebird whose survival faces threats from human disturbance across its breeding and wintering range. The piping plover, an endangered species in New Jersey since 1984, relies on sparsely vegetated, undisturbed expanses of open beach, a combination of characteristics that can be hard to find in the nation’s most densely populated state, whose beaches are famous for their recreational value. Maslo’s goals are to better understand where piping plover habitat needs management, and to recommend strategies for maintaining the integrity of these critical areas.

In the last two years, Dr. Maslo’s research has extended beyond New Jersey’s beaches and into its caves, where she has studied the effects of White Nose Syndrome (WNS) on New Jersey’s overwintering bats. Arising from causes that are as yet not entirely understood, WNS has devastated bat
populations across the eastern United States since the winter of 2007-2008, with the decline in northeastern bat populations estimated to be as high as 80 percent. Dr. Maslo’s research focuses on how bats are responding to this intensive selective pressure. According to Maslo, after the initial infection by the fungus, declines in bat populations in a given cave appear to slow or stabilize; her research seeks to determine whether this reflects a true adaptive response to WNS, or if it is simply the result of bats moving into a cave from other locations. Maslo also investigates bats’ value in controlling insect agricultural pests, with particular attention paid to how they might help control invasive species such as the brown marmorated stinkbug.

In the classroom, Maslo is known and respected for her hands-on methods of involving her students in wildlife conservation. In her Wildlife Ecology and Conservation course, Maslo encourages her students to “look at each lecture as a tool in the toolbox,” which they can then use to define, study, and address problems in species management. Maslo’s students receive plenty of opportunities to use this “tool box”: the course culminates in students creating a management plan for a species of conservation concern. In addition to building her students’ portfolio of practical skills, Maslo fosters professional relationships between her students and researchers in her field, pairing each student with a wildlife professional to accompany on a research excursion. In many cases, Dr. Maslo reached out to these professionals having never previously met them, all in the pursuit of securing a more thorough and firsthand educational experience for her students.

It is for this dedication to wildlife and inspiring young conservationists that Dr. Maslo was honored as a recipient of the 2014 Women & Wildlife Awards. Her merit in receiving such an honor is well-known and widely supported: a variety of actors, including numerous members of the Ecology, Evolution and Natural Resources Department, as well as fellow wildlife professionals, supported her nomination by testifying to her efficacy in the classroom and the field. In her considerable contributions to the conservation of wildlife, Dr. Brooke Maslo is an outstanding representative of female scientists, conservationists, and leaders who carry the world into a more environmentally just future. The environmental movement owes much to women like her.

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Interview with Dr. Brooke Maslo
Super Soil

By William Shinn

It is inevitable that leaves will continue to fall from the trees this autumn, just as they do every year. This annual event can be a wonderful sight or a nuisance if you are the type of person who is obsessed the appearance of your lawn. Regardless, there is a wonderful solution for the leaves if you are committed to Mother Nature or just to keeping your yard clean. What I am talking about is a method of composting called “vermicomposting” or composting with worms. This method may seem a bit strange to some, but the results are incredibly rewarding and environmentally friendly to say the least. Worms are able to break down things like leaves, newspaper, cardboard, and most food scraps to produce an incredibly nutrient rich, organic fertilizer.

While there is no bad time to start a worm bin, fall seems like a great time to begin as there is an abundance of free bedding simply falling from the sky does it not? I began my bin at the beginning of this semester and hope to make a small instructional article so you can get an idea of what starting your own bin might entail; though I would look online for more detailed information if you are ready to commit to vermicomposting.

The first thing you will need to get started the worms themselves, red wigglers are recommended for composting and can be purchased online in various quantities. Now you will need a container for your scavenged bedding and the worms, anything from a 5 gallon bucket to a 55 gallon drum will work depending on the space available to you. After deciding on a home for your new friends you will need to be sure that it is properly ventilated by drilling some holes in the sides and top of your bin. There should also be a whole drilled strategically on the bottom so that any excess liquid is able to escape and be collected in a separate container to be saved away until spring. The bin should now be prepared and is ready for the bedding, which can be anything from decaying leaves and garden soil to shredded newspaper and brown cardboard. It is optimal to have a number of these items as your bedding, because not only do the worms like them, but because it means they are being returned to the soil as efficiently as possible. It is also important that the bedding be moistened with a glass or two of water depending on the amount of dry material you have in the bin.

Now just add your worms and be proud of yourself as they acclimate to their new home. After a day or two you are welcome to start spreading you kitchen scraps and other yard waste over the top of the bedding, even mixing it in to ensure the worms find their food easily. Be careful to avoid greasy foods, meats, dairy, citrus fruit, onions, and peppers which may all go untouched and rot or potentially harm your worms. As long as you do not overfeed the worms or give them something they do not like, all scraps should be eaten and converted into a stench free fertilizer referred to as worm castings. These casting are exactly what you are after and are the main benefit of having your own worm farm. After two to three months, your worms should be separated from their castings and put back into their bin with fresh bedding to begin the process once more.

The worm bin is a great hands on project for just about anyone provided they have the space and stomach for these absolutely essential creepy crawlers. Whether you are aware or not you are helping convert plant matter back into available nutrients for plants growing in any soil mixed with the castings your worms have produced. The castings actually enrich the soil while breaking down unlike chemical fertilizers, which tend to run off into storm drains or feeder streams that do not need the excess nitrogen and other chemicals. Worm bins are a no brainer in my mind, and I hope to see more people accepting the idea as it seems like one of the many cultural changes we so desperately need in order to move into a sustainable future.

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In recent years, there has been an influx in the number of invasive carp in the Great Lakes' waters. Most commonly found is the silver carp that, in addition to the high population threatening ecosystem diversity, causes a physical threat as they leap from the water when startled.

Silver carp is a variety of Asian carp, a species native to China and Eastern Siberia. The Asian carp was brought to the United States in the 1970s to help control the level of algae at sewage treatment plants in the South. Over time, the carp made their way into the Mississippi River and have since migrated up to the northern waters and the Great Lakes. As a species, they are able to grow and reproduce quickly.

This invasive species is a threat on many levels to the well-being of the Great Lakes. Silver carp have the peculiar tendency to leap out of the water when distressed, which occurs often even when only small boats are passing by. Silver carp can weigh up to 60 pounds, thus posing a formidable risk to small boats and fisherman that frequent the Lakes.

Carp also pose a threat to the health of the Great Lakes ecosystem. The fish have a rapid growth rate and have a voracious appetite for algae and have highly specialized feeding adaptations that make them well equipped to filter exceedingly small food particles from the water. According to the US Geological Survey, Asian carp eat between 20 and 120 percent of their body weight in plankton each day. These adaptations allow the silver carp to outcompete many of the native fish species of the Great Lakes.

Stepping away from the ecological issues, the overpopulation of Asian carp has an effect on economics as well. The competitive exclusion promoted by the growing population of silver carp poses a threat to the fishing industry which brings in about $7 billion a year in the Great Lakes region. A study done in 2012 looked into the costs of damages from invasive species in the Great Lakes region, showing that there is about $138 million a year in expenses due to invasive species (Wall Street Journal). Granted, this is not all coming from the silver carp, but they are a major invasive species that is contributing to the decline in biodiversity in the Great Lakes ecosystem.

In order to keep these carp out of the Great Lakes region, there have been many projected plans, but the cost is a huge barrier that prevents these plans from being put into action. The most intensive, yet effective, way would include a physical barrier between the lakes the Mississippi River basin. This plan would cost over $18 billion to complete, and 25 years to build. Although theorized to be the most ideal mitigation method proposed as of yet, the cost and time to complete the barrier decreases its efficacy. Moreover, there are no cheap options to fix this problem, but the most economical choice, which is being implemented, is electric barriers. There are already electric barriers set at various points along the waterways leading to the Great Lakes, but by increasing the number, it is a comparatively cheap and easy way to help prevent the migration of the Asian carp into the Great Lakes.

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Agritourism: the Good, the Bad, and the Ugly

By Tom Armstrong

It’s that time of year again, the leaves have morphed into an array of oranges, reds, and browns and the brisk autumn air is in full swing. A perfect time for outdoor activities and a visit to the local farm for apple and pumpkin picking, hot apple cider, and if you are feeling really daring, a trip into that seemingly endless corn maze. While many of us enjoy these annual trips to visit our rural counterparts, the Agritourism industry is experiencing increased scrutiny from government regulators as well as local communities of the increased traffic and at times, the unsafe conditions.

For many, the idea of residing in suburbia conveniently close to both local farms as well as the nearby city seems ideal for raising a family. While this still holds true for many, there has been increased tension between farmers and their non-farming neighbors. From disputes involving noxious smells emanating from the farm, to increased traffic at the farm during autumn activities, farmers are struggling to maintain civil relationships with neighbors. Many times those not too familiar with farming practices move close the local farm with glorified visions of buying fresh eggs, meat, and poultry, fresh milk daily, and having the kids go visit the animals after school. This notion is often far from the truth for a variety of reasons. People often forget that these animals that they think of as babe the pig, or the playful cows from the Chick-Fil-A commercial, do smell and that their odors often linger. They forget that loud machines often assist in the daily chores of many of these farmers, and that they do not typically work the 9-5 as most of us do.

The aforementioned issues are seen year round; however tensions increase during the fall and winter with people eager to visit the farm for hayrides, apple and pumpkin picking, and even cut your own Christmas tree plots. The traffic and noise increase, and some inconveniences and possibly even dangers arise. Many of the concerns neighbors express stem from inconveniences, but with the recent death of 2 year old Elizabeth Fuehring, Agri-tourism is experiencing increased publicity and rightfully so. Traffic was such an issue at Alstede Farms in Chester, New Jersey that it took a life and severely hurt another. In a town that once experienced little traffic and congestion now has an abundant amount of people flocking to Alstede farms, which endangers the local community and inconveniences residents. While the events that took the life of Elizabeth Fuehring are tragic and most surely not in vain, they raise questions of regulation and feasibility in the Agri-tourism sector.

Agri-tourism provides farmers an alternate source of income that help to cover costs in which production is typically at its lowest. For years government regulators have acknowledged these struggles and the Right to Farm law has ensured that they can in fact engage in Agri-tourism ventures. This law has come under increased scrutiny with local municipalities unable to regulate or even assist farmers in the areas of traffic concerns and crowd control. While these laws allow farmers to gain revenue through tourism opportunities, it may be time to reconsider the laws that regulate these industries.

Agri-tourism can be a beautiful thing that engages local farmers with local communities; however, the way in which these farms operate and the laws that govern them need to be re-examined. Agri-tourism provides numerous benefits to many New Jersey Farmers and even local youths who may find seasonal employment. However, agri-tourism must not be at the expense of the town and cause any sort of harm to local residents. Serious discussions need to be made between farmers, local municipalities, and state legislators in order to decide the best ways in which to safely engage in the value industry of Agri-tourism.

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Vegetation of Certain Climates Proves Resistant to Climate Change

By Alexander Nayfeld

The implications of climate change are becoming abundantly clear: a delay or misstep in action will prove fatal to global ecosystems as we know them. New research and scientific analysis, however, provide a glimmer of hope in a time where naturally operating organisms seem damned to dwindle in a drastically changing ecosystem wrought by human polluting activities. In the Middle East, or arid regions in general, the prognosis of climate change seemed dismal; in an area known for its water scarcity, annual rainfall was estimated to only become rarer as a result of climate change on a global level, inciting destruction of ecosystems known to be particularly sensitive to water variability. The merit of these predictions was tested by Professor Marcelo Sternberg of the Department of Molecular Biology and Ecology of Plants at Tel Aviv University’s Faculty of Life Sciences, along with ecologists from the University of Tübingen in Germany. Together, over the course of 9 years, they subjected vegetation occurring within dry environments within simulated natural ecosystems to hypothetical weather conditions, such as extreme drought, which are predicted to overtake the Middle East in the future; the results were unexpected.

This experiment itself was conducted in four different ecosystems ranging from desert conditions (3.5 inches of annual rainfall) to moist Mediterranean woodland (30.7 inches of annual rainfall). Contrary to predictions, there were “no measurable changes in annual vegetation which could be seen”, according to the study. “None of the crucial vegetation characteristics – neither species richness and composition, nor density and biomass – had changed appreciably in the course of the rainfall manipulations”. This newfound data will prove to be pivotal in reanalyzing the correct strategies to combat climate change and cope with its effects. This will largely be present in one of two ways: first, understanding the ecosystems most and least affected by particular facets of climate change will allow humanity to direct its resources to aid more vulnerable ecosystems accordingly, and secondly, mankind will have to reevaluate what it knows as conventional wisdom with regard to the effect variability of climate factors has on biological structures, and how this will precipitate in altering global ecological landscapes.

Marcelo’s research, compounded with new research published by the Wildlife Conservation Society, will serve to aid environmentalists into channeling preservationist and conservationist resources far more efficiently than ever before. Data collected from all reaches of global ecosystems have allowed scientists from the Wildlife Conservation Society, the University of Queensland, and Stanford University to predict how climate change will specifically impact a unique region or environment.
In conjunction with one another, these institutions of ecological innovation have formulated a map (Picture 1) which clearly identifies the world’s most and least vulnerable areas with regard to climate change. "We need to realize that climate change is going to impact ecosystems both directly and indirectly in a variety of ways and we can't keep on assuming that all adaptation actions are suitable everywhere. The fact is there are only limited funds out there and we need to start to be clever in our investments in adaptation strategies around the world", said Dr. James Watson, Director of WCS’s Climate Change Program and lead author of the Nature study. Thus, the work which these research institutions have conducted is absolutely invaluable because it provides insight into the manner in which climate change is directly impacting specific regions, and how best to mitigate these effects by maximizing the resources available to us. The vulnerability map shown (Picture 1), in conjunction with this article, demonstrates the interrelationship of two separate criteria: how intact an ecosystem is presently, and how stable the ecosystem will be under the standards held by current predictions of climate change. The analysis creates a system of rating containing four categories for global land-based ecosystems: “ecosystems with both high climate stability and vegetation intactness are dark grey, ecosystems with high climate stability but low vegetation intactness levels are dark orange, ecosystems with low climate stability but high vegetation intactness are dark green, and ecosystems that have both low climate stability and low levels of vegetation intactness are pale cream”.

Understandably, contradictions in previously held beliefs brought about by new scientific findings may prove to be discouraging, proving that even those fighting for environmental justice have much left to learn to become effective in their methods. But the very essence of science is that of shifting knowledge paradigms, and to not be receptive to these changes and not using them to one’s advantage would be foolish. With this new knowledge, for example, it is now known that areas with both high vegetation intactness and high climate stability are those which are most worth putting forth resources to protect, as they have the highest probability of species retention. Further, we may also conclude that “ecosystems with low levels of vegetation intactness and low climate stability would be most at risk and would require significant levels of investment to achieve conservation outcomes”.

The fruits of scientific analysis bring forth a more effective means of distributing resources to ensure maximal preservation of ecosystems on a global scale. With knowledge of what sorts of vegetation are vulnerable to climate change, which are not vulnerable to climate change, and which specific regional environments warrant the most attention, it becomes increasingly possible to fight smarter, not harder. When platforms of conventional belief become contested by the scientific community in order to shed light on important subjects, it is the entire world which benefits, and brighter future prospects are ensured.

Sources:
In 1851, Johann Jakob von Tschudi, a Swiss physician, encountered a group of peasants in Styria, (now a region of Austria) who ate very small quantities of arsenic. While many of these townspeople took arsenic in lentil-sized doses “to acquire a fresh complexion and appearance of flourishing health”, their use was daily and doses would eventually increase. Some townspeople went so far as to take four grains of arsenic, enough to kill an adult. However, the townspeople’s use of arsenic was so consistent, more problems would arise if their use was abruptly stopped. Many would go through withdrawal symptoms such as “anxiety, indigestion, loss of appetite, vomiting, constipation and spasmodic pain.” But there were also many who overindulged in this practice of arsenic eating and ultimately died of chronic use.

While there have been many of these small groups who have taken arsenic for health reasons, current definition of inorganic arsenic stresses its toxicity as it can have acute, subacute, and chronic effects. But what is worrisome, are the recent studies that have shown increased levels of arsenic consumption, and not by choice.

Arsenic (As), a naturally occurring element, is considered to be a metalloid (possessing some qualities of a metal), and can be found in both organic and inorganic forms. The latter of which is considered more dangerous. While it is naturally occurring in water and soil, 1 to 40 parts per million in soil and 2 to 5 parts per billion in seawater, elevated amounts in fresh water sources and agricultural fields have been found due to erosion of arsenic-containing rocks, volcanic eruptions, contamination from mining and smelting ores, and previous or current use of arsenic-containing pesticides. This has become a cause of concern not only for our drinking water and shellfish consumption, but now more imminently our consumption of rice as well.

While fish and shellfish have high arsenic levels due to bioaccumulation (about a thousand times greater than seawater), these levels are relatively non-toxic as arsenic is present in its organic form. What makes inorganic arsenic much more dangerous is a much smaller dose is required to have a negative effect; inorganic arsenic is classified by the Environmental Protection Agency (EPA) as a known carcinogen based on extensive population studies of lung cancers following inhalation exposure, and skin cancers following ingestion of contaminated drinking water in adults. Rice, too, poses a problem as it readily takes up much more inorganic arsenic than other plant based foods. As fields are ploughed, fertilized, and smoothed, seedlings are then placed in beds for a period of 30-50 days, and are then transplanted into paddies which have been flooded by rain or river water. Irrigation is maintained by a series of dike controlled channels. This farming practice, most commonly used in Asian countries, with its heavy use of river water is susceptible to a much higher uptake of inorganic arsenic, especially if it has a higher presence in the soil, and if the river/well water is already compromised.
According to the International Rice Research Institute (IRRI), about three billion people eat rice every day, a figure that has increased significantly since 2010. In addition, more than 60 percent of the world’s one billion poorest and undernourished people who live in Asia depend on rice as their staple food. While Americans eat a little over than 20 pounds of rice per year, Asians eat as much as 300 pounds per person each year. The practice of flooding rice paddies with river water and then consuming the crop at such a high rate, has become problematic for Asian countries and its citizens. While the exact figure of inorganic arsenic being consumed remains unclear, a study done in Guangdong Province, China has seen twelve of its commonly grown rice cultivars be compromised. “The results showed that grain arsenic concentrations in all the surveyed rice failed national food standards.” Researchers concluded that the accumulation of arsenic was due to lead and zinc mining activities in the nearby area.

The consumption of rice is not only a mean of sustenance, it is equally important as a cultural and economic resource. As impacts toward the environment become more violent, its regrettable effects will worsen. Research is continuing especially in China, India, and Indonesia, three of the heaviest rice consumers and producers, and cleaning up pollutants that lead to inorganic arsenic uptake will become unavoidable.

Here in the United States, the Food and Drug Administration (FDA) suggests to keep eating rice and rice based products as the amount of inorganic arsenic, although increased, is far from bringing about harm. As a result of ongoing research, the FDA has been prompted to think about regulating arsenic in rice, as no regulation of arsenic in food exists so far. A result of their 2013 Consumer Update, found the average levels of inorganic arsenic ranged from 2.6 to 7.2 micrograms per serving of rice, with instant rice at the low end of the range and brown rice at the high end. Finally, a risk assessment that will look at the degree of exposure and the hazards of arsenic in rice and rice products is currently underway.

Sources:
- FDA: http://www.fda.gov/Food/FoodborneIllnessContaminants/Metals/ucm319948.htm
- Rice Association: http://www.riceassociation.org.uk/content/1/14/cultivation---harvesting.html
Students for Environmental Awareness (SEA) Climate Change Film Screening

SEA is hosting a film screening on November 17th at Trayes Hall B in the DCC from 7:45-11:15 where we will show two documentaries about climate change, The Island President and Disruption. There will also be a question and answer session with anthropology professor David Hughes and meteorology professor Benjamin Litner.

Island President Trailer: https://www.youtube.com/watch?v=ryhr_T7cRnY
Disruption Trailer: https://www.youtube.com/watch?v=OWpK7XLqtxw4

Amanda Collins, 28, took "beauty pageant mom" to the next level (down) earlier this year when she entered her daughter Luna in Britain’s UK Princess and Prince International -- based entirely on Luna's ultrasound scan at age 20 weeks. Said Collins, "As soon as I saw her image on the screen ... I knew she was a stunner." Contest officials had accepted the scan application, and six weeks after birth, Luna was named runner-up in the Princess and Prince, and on top of that, four weeks later, runner-up in Miss Dreams UK. "All she has to do," said Collins, "is lie in my arms and smile as I stroll down the catwalk." [Daily Mail (London), 10-26-2014]

In the most recent incident in which a driver actually ran over himself, a man in Aurora, Colorado, suffered life-threatening injuries on October 26 when, as he backed out of his driveway, his front driver's side tire ran over his head. He had jumped out the door to avoid a lit cigarette that had fallen into his jacket, and as he fell, he landed underneath the driver's door as the van continued slowly in reverse.

Questions, comments, or suggestions?
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