The EPIB Trail staff is proud to present you with our second issue of the Spring 2015 semester. As the weather gets warmer and you dig your summer clothes out of the back of the closet, we hope you enjoy reading about topics like New Jersey’s wildlife, the environmental impacts of music festivals, and sustainable restaurants. We’re so excited for the New Jersey Folk Festival, Ag Field Day, and all of Rutgers spring activities.

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A Special Thank You to Our Wonderful Advisors:
Kristen Goodrich & Dr. George F. Clark
On May 28, 2008, Adam LeWinter and Director Jeff Orlowski filmed a historic geographical event at Ilulissat Glacier in Western Greenland. This amazing “calving” event, the splitting or shedding of ice, was caught on tape by Photographer James Balog and his crew. The film, as it came to be titled “Chasing Ice” and won an award for Excellence in Cinematography at the 2012 Sundance Film Festival and the Best Documentary from the International Press Association. “Chasing Ice” has also won over 30 awards at festivals worldwide.

The occurrence lasted nearly an hour and 15 minutes and is the largest event of its kind to be filmed. To put the phenomenon into a more familiar perspective, the mass of ice seen breaking away from the island is roughly equivalent to the size of Manhattan and about 2-3 times higher than the average building height in Manhattan.

Greenland is the island has only 56,900 inhabitants, even though Greenland is the largest island in the world and second largest ice body, after Antarctica, with a total area of about 2,166,000 km. Only approximately 410,000 km consists of exposed bedrock and the remaining landmass, roughly 80% of the landmass (1,756,000 km), is covered by an “inland ice”, or ice sheets, that measures over 3km in thickness. Contrary to what some may think, there are many wildlife species that can survive Greenland’s extremely harsh weather conditions. Not only can polar bears and walruses be seen in Greenland, but are over 60 species of birds, among many other mammalian friends, such as wolves, reindeer, musk ox, arctic foxes, mountain hares, and other small terrestrial mammals.

Over the last 100 years, from 1902 to 2001, approximately 8 miles (12.8748 km) of glacial ice receded into the ocean. But- in only the last 10 years, from 2001 to 2010, 9 miles (14.4841 km) of ice has retreated away from the island. More than ever before, we are witnessing the harsh consequences of Climate Change as a result of over-consumption, over-population, and fossil fuel usage.
Many other major calving events have taken place before the Ilulissat Glacier event. The only difference is that the events were never caught on tape, only observed and/or documented. In October 1988, an iceberg (150 km x 50 km) broke from the Filchner-Ronne Ice Shelf, roughly the size of Delaware. The largest calving event ever observed happened at the Ward Hunt Ice Shelf sometime between August 1961 and April 1962 where almost 600 km$^2$ of ice broke away. In 2005, nearly the entire shelf broke away from the northern edge of Ellesmere Island and since 1900, about 90% of Ellesmere Island's ice shelves have calved and floated away. Jakobshavn Glacier or Sermeq Kujalleq are areas of continuous calvings, where annually, about 35 billion tonnes of icebergs separate and pass out of the fjord.

What causes calving? Longitudinal stretching can cause calving events, because the stretching controls the formation of crevasses. When crevasses penetrate the full thickness of the ice, calving will occur. Large-scale tidal and seismic events, buoyant forces and meltwater cascades have the physical potential to create calving events. Calving can also occur as a result from waterline melting, where only the subaerial part of the glacier detaches, leaving a submerged ice 'foot'. Upward buoyant forces cause this ice foot to break off and emerge at the surface. The process is extremely treacherous, as it usually happens with little warning.

The factors that contribute to calving have been identified, but a reliable predictive mathematical formula is still under development. Data that has been collected from ice shelves in Antarctica and Greenland are used to establish what will be known as a 'calving law'. Temperature plays an important role when calculating for calving events; therefore, as global climate temperatures increase we can expect to see more of these powerful events.

As California continues to suffer through its worst span of drought conditions in recent history, possible solutions have become increasingly innovative. Turning to the oceans as a potential answer, desalination has become an increasingly researched technology with what will be the nation’s largest desalination plant being constructed in Carlsbad, California. With an estimated completion by 2016, this one billion dollar desalination plant is proposed to produce about 50 million gallons per day of potable water for residents of San Diego County. The desalination plant is designed to clean ocean water and turn it into drinking water through the process of reverse osmosis. In the reverse osmosis process of desalination, ocean water is pressurized using high-pressure pumps to overcome osmotic pressure and push the water through a semipermeable membrane that filters out particles and impurities, leaving only potable water.

Although this seems like the perfect solution to California’s current dry spell, environmentalists have argued against the high-energy costs of the plant as well as its high potential to harm marine life and ecosystems. With 14 lawsuits and appeals filed by environmentalists protesting the construction of the plant to no success, the question of whether the benefits of this project are worth the costs becomes the main issue. Considering the potential for billions of dollars in economic losses (primarily in agriculture) as a result of the drought, California, a state known for its stringent environmental policies, has put all of its eggs in the one basket of ocean water desalination. With what will be the largest plant of its nature in the Western Hemisphere, all eyes are on the progress and results of the plant in what could be a revolutionary project not only for California, but for other countries around the world that face similar water issues.

A huge aspect of the success of this plant comes down to the price of the clean water that is produced as well as the energy cost involved in its production. So far, estimates have the Carlsbad desalination plant operating using 38 megawatts of power per day to force about 100 million gallons of water through multiple membrane filters. This power consumption is equivalent of powering about 28,500 homes. This may seem high, however considering that San Diego has on average received about 10 inches of rain in the recent years, this cost may be necessary in order to prevent the strain on other current water resources being utilized in the region such as the Colorado River and the San Joaquin River Delta, which are both already being strained severely.

Desalination in California has had success in the past in the form of a $34 million dollar desalination plant in Santa Barbara that operated for four months in the early 90s. This plant was successfully able to mediate water resources during the drought that occurred in the late 80s until the drought was declared over, deeming the plant unnecessary and resulting in its closure, as water prices no longer were competitive. However, as current drought conditions in California only worsen, the odds of the plant becoming obsolete shortly after its completion look low and for now it may be the best bet as a solution to this water crisis.

http://carlsbaddesal.com/
The Wolves of Isle Royale National Park

By Holly Berman

Isle Royale National Park in Michigan is made up of about 400 islands in the northwestern portion of Lake Superior. Since 1958, Isle Royale has been the site of the longest continuous study of a predatory-prey relationship, conducted by the Wolves and Moose of Isle Royale Project. As Isle Royale is small, isolated, and protected by its national park status, there is little to no human interaction or introduction of outside species. This makes for a relationship in which wolves are the sole predator of moose and moose are the overwhelmingly predominant prey of wolves. The Wolves and Moose of Isle Royale Project website explains, “The purposes of this project are to better understand the ecology of predation and what that knowledge can teach us about our relationship with nature. Much of what we have learned is associated with having been patient enough to observe and study the fluctuations in wolf and moose abundances”.

Since 1958, both wolf and moose populations have fluctuated dramatically. By 1969, the abundance of wolves showed little fluctuation, while the moose population almost doubled after several mild winters in a row. By 1979, after several harsh winters, the moose population showed severe decline due to increased wolf predation, while the number of wolves grew. In 1979, canine parvovirus, a wolf disease, was inadvertently introduced by humans, which caused a large decline in wolf population numbers. By 1989, the Project explains, “With a reprieve from wolf predation, the moose population explodes. We begin to think, but cannot yet prove, that inbreeding among wolves explains why they languor in low abundance for over a decade”. By 1996, a variety of environmental factors resulted in the collapse of the moose population, including competition for forage, a severe winter, and an outbreak of winter ticks. In 1997, the introduction of a new wolf from Canada brought new genes to the pool, resulting in erratic wolf population rise. By 2009, wolf and moose populations were both low, with a documented 24 wolves living on the island.

Recently, for the first time, a wolf was tracked crossing an ice bridge onto Isle Royale. Previously, ecologists had not known how wolves from outside populations had made it onto the island. National Geographic calls this “an impressive feat that might be a hopeful sign for the predator's ability to survive climate change”. Scientists managed to place a GPS collar on a female wolf, which left her territory in Eastern Minnesota on February 22nd, 2015 to travel 14 miles across an ice bridge on Lake Superior to the population of island wolves. National Geographic reports, “an un-collared companion of unknown gender came with her; the pair stayed on the island a few days before returning home on February 27, according to GPS data collected by Seth Moore, director of biology and environment for the Grand Portage Band of Chippewa”. Scientists have previously predicted that this is how outside wolves have gotten to the island, but this was the first event to prove this theory. The idea that wolves can quickly travel over ice bridges, to some scientists, suggests that the species may be more easily able to adapt to the environmental changes of climate change than was previously assumed. In the meantime, it is debatable whether or not the National Park Service will intervene to help revive the wolf population. Many experts believe that due to the genetic problems with inbreeding, the Isle Royale pack will die out if humans do not bring outside wolves to the island to encourage genetic diversity.

Scientists have learned a great deal from such a long, continuous study, but the Wolves and Moose of Isle Royale Project points out that there is still much to learn: “With the wolves and moose of Isle Royale, where we are simultaneously and paradoxically impressed with how much and how little we understand. Voltaire was right, ‘the more we know the less certain we are.’”

http://news.nationalgeographic.com/2015/03/150310-wolves-isle-royale-animals-science-ice-bridge/
http://www.isleroyalewolf.org/overview/overview/at_a_glance.html
https://www.press.umich.edu/286862/wolves_of_isle_royale
In the Wake of Keystone Decision, Mixed Views on Implications

By Alexander Toke

Tuesday, February 24, 2015 marked the first time that President Obama has exercised his executive veto privilege in five years, on an issue that has divided Americans since 2011: the Keystone XL pipeline. The proposed pipeline, which would have transported oil from the Tar Sands deposits in Alberta, Canada, to the Gulf coast of Texas, was and is a major point of contention among U.S. voters and policymakers. Proponents of the pipeline argue that it would stimulate job growth via construction and maintenance, and would also help drive American energy independence, while detractors of the proposed project site the environmental impact of the refining and burning of those fossil fuels on the climate; in addition to the social justice impacts and environmental degradation caused by potential spills. Tar sands have been cited by environmental activists as being “dirtier” than regular crude oil and that the refining of the oil from tar sands could potentially have grave implications for the cutting of U.S. carbon emissions, which play a significant role in exacerbating global climate change. The Environmental Protection Agency recently released a report stating that allowing the pipeline’s construction would contribute to U.S. emissions, as well as potentially damage water infrastructure and pollute the local environment over which it passed.

While the President did not and cannot directly veto the pipeline itself, he did veto the bill proposed by the United States Senate that would have approved its construction across the border with Canada before a State Department review could determine its environmental and social impacts. The President, and by extension the State Department, has jurisdiction over any projects or entities that cross United States borders, however, and used that power to veto the construction bill to the chagrin of congressional Republicans and their supporters. While this does not mean that the pipeline’s construction is stalled in perpetuity, the president can still approve its construction following the State Department’s appraisal of the project, what the veto represents is a dramatic upset in U.S. environmental policy and activist participation in the policymaking process.

Michael Brune, executive director of the Sierra Club says that “most actions that have been taken on climate change have been about smokestacks and tail pipes,” but Keystone XL he acknowledges, “...has been the first major public fight to argue that we have to begin to curtail production.” This kind of stance has polarized the struggle between activists and the fossil fuel industries whose business model necessitates the continued increase in energy resource exploitation. Grassroots environmental activism has been steadily gaining momentum in the United States and across the world over the past several decades, with events like the People’s Climate March in September of 2014 showcasing record numbers of activists around the globe marching in solidarity for environmental issues. It is possible to make the assumption then, that the outpouring of public opposition to the pipeline indeed, at least partially, motivated President Obama to veto the bill, an action he declared that he would take long before the matter came to a vote.

It seems, for now, that the stalled pipeline is beginning to become a bad investment for the fossil fuel industry. With the costs of transporting oil by rail increasing, and the OPEC-led depression in global oil prices stressing America’s oil and gas industries, environmental activism seems to have buoyed the President’s veto pen from the hopes of an oft-marginalized movement to the reality of delaying, perhaps permanently, a major potential threat to the American and global environment. The implications of this decision however, make environmental policy that much more of a crucial issue in American policymaking, with repercussions that will affect the entirety of the planet.
A typical 747-8 Freighter plane can carry 400,000 pounds (60,000 gallons) of fuel. According to Boeing, this fuel would be completely used up on a flight from Frankfurt to Chicago. At 21.1 pounds of CO\textsubscript{2} emitted per gallon of jet fuel used, this flight would thus cause the emission of 600 tons of CO\textsubscript{2}. That is an example of just one flight among the thousands every day that transport our goods and services—as well as our people—all around the globe. Unfortunately, in comparison to most forms of transportation on an individual basis, airplane travel is as dirty as it gets. From tourism to business and commerce, all forms of transportation on Earth are currently entrenched in such a dirty cycle—fossil fuels in, greenhouse gases out. The world's jet engines, though incredible in their extent and influence, are rapidly proving to be a costly investment in fossil fuel based transportation. It is no doubt exciting then to see that renewable energy technologies are beginning to become a viable alternative to their dirty counterparts of oil and gas.

In 2008, for instance, the United Kingdom looked to break an “endurance record” for an unmanned aircraft. They sent up the Zephyr-6, a plane with a 6 meter wingspan and absolutely no on board fuel; having a series of solar panels lined the wings, providing power gathered from the sunlight to batteries in the cargo bay. The plane flew for 3 consecutive days at a sustained altitude of 60,000 feet. Though unmanned, the Zephyr-6 was a brilliant development for solar based aircraft initiative and paved the way for the next breakthrough: The Solar Impulse. Though unconnected to the Zephyr-6 design team and the government of the United Kingdom, the Solar Impulse and the subsequent Solar Impulse-2 has proven to be the most exciting development in solar flight to date. In July of 2013, a solo pilot flew the Solar Impulse plane across the continental United States. It achieved this goal over a period of 2 months, stopping in major cities due to complications with high winds and inclement weather. This plane, the first incarnation by the Swiss team of engineers, achieved a speed of 86 miles per hour at its peak.

The second plane, Solar Impulse 2, is currently undergoing a more arduous trek. The Swiss team is attempting to circumnavigate the globe using only solar power. Considering the 90 mph peak speed and lightweight of the aircraft it will prove to be a most difficult journey, particularly when flying across the Pacific and Atlantic oceans. To put the undertaking into perspective, the 4-propeller plane has a wingspan of 236 feet but only weighs 5,000 pounds. The Boeing 747-81 (one of the largest commercial planes in use today) has a wingspan of 223 feet and weighs a staggering 735,000 pounds. The slight nature of the Solar Impulse-2 has proved a logistical challenge but so far the plane has completed 6 legs of its 22,000-mile journey. The plane has one compartment in the center, which houses both the batteries that provide the consolidated solar energy to each of the 4 propellers and the very cramped cockpit for a single pilot.

It is exciting to see such an attempt being made, because the idea of solar powered aircraft is in its infancy. Watching as this technology rapidly develops is both heartening and inspiring in that it is beginning to fill a much needed carbonless niche for aerial transportation. Hopefully, given more time and research, commercial solar airplanes will become a reality. Solar technologies are becoming commonplace sights in our society, from the small panels on telephone poles to the cells lining suburban housing. Companies like Tesla are beginning to develop amazing technologies in the realm of solar powered ground vehicles, with fantastic results. On March 16\textsuperscript{th}, Gov. Chris Christie of New Jersey signed into law a bill that will allow the sale of Tesla cars directly to the customer. Despite the many hurdles that these new technologies face in the form of discriminatory legislation and lobbying efforts, (we're looking at you, fossil fuel industry) innovation is coming—and fast.

⇒ http://www.eia.gov/environment/emissions/co2_vol_mass.cfm
⇒ http://news.bbc.co.uk/2/hi/science/nature/7577493.stm
Giving a Voice to the Silenced

By: Alexander Nayfeld

The human race is currently afflicted by something far more dangerous than even the most purportedly deadly diseases known to us. This affliction, unbeknownst to most, results in more casualties annually than tuberculosis, HIV, and malaria combined. However, this destructive force is almost entirely more preventable than all of the aforementioned diseases. This killer, totaling approximately 8.4 million deaths in 2012, is pollution.

Staggering death figures surrounding pollution-related illnesses are not discussed with much veracity in influential circles, however. Organizations such as the Global Alliances for Health and Pollution (GAHP) are desperately petitioning the United Nations for more globalized attention on the persisting issues of pollution-related deaths, but support is difficult to attain.

The problem herein lies in the fact that developed nations with sufficient environmentally sustainable infrastructure already possess the economic means to work toward providing their citizens with adequate pollution regulations. Wealthy nations, then, already have a steady base of capital upon which they can develop sustainable environmental practices, and need not worry about the immediate economic consequences of green investment. Underdeveloped nations lack any such luxury resembling economic stability or prosperity. Seemingly, their only hope to join the echelon of economically successful nations is to trudge through a period of destructive industrialization, just as Britain and America had done, and therein lays the pitfall of these countries seeking wealth. Indeed, the first Clean Air Act was only passed after Britain’s greatest pollution disaster, the “Great London Smog” of December 1952, which killed approximately 4,000 people in the span of a single month.

Governments which lead the so-called “undeveloped nations” are acutely aware of the benefits which economic prosperity brings forth: higher standard of living, longer life spans, and increased productivity overall. The folly of these nations involves their choice to ultimately undertake the obvious route of economic progress: that of environmentally destructive industrialization, and paying, in the meantime, no attention to the costs of life and health these activities may have.

For them, it makes short-term economic sense to impress upon their collective societies dismal environmental conditions in exchange for simple corporate revenue streams. It seems, to these poorer nations, that environmentalism is simply too expensive for them to facilitate whilst maintaining a trajectory of economic improvement. China had taken this exact path in their quest for economic influence and power as had Britain and the United States in the past; ultimately, China succeeded. The cost, unfortunately, proves inordinate in scope, as scientists now proclaim that China’s levels of pollution are now so bad that “they resemble a nuclear winter”. Beijing’s concentration of PM 2.5 particles, or those small enough to penetrate the lungs deep enough to directly enter the bloodstream, reached 505 micrograms per cubic meter. The World Health Organization recommends a safe level of 25.

But, to give credit where it is due, China regularly has an annual increase in GDP of 10 percent, a rate which is essentially unprecedented for any modern nation. It comes as no surprise, then, why the appeal of rapid and unregulated industrial practices in order to incite economic growth is appealing to developing nations. The harsh reality is that negligent industrialization works in what it is primed to do: grow the nation’s economy. A lack of regulation equates to fewer impediments in industry, and uninhibited industry directly leads to more capital and revenue inflow to a nation’s economy. Simply put, the process of rapid industrialization is effective, and no one can put forth an argument, which directly discourages economic growth for nations that are lagging behind in living standards.

The governments of these underdeveloped nations care not for the wellbeing of their people in the short-term insofar as economic growth is concerned. Their stance on the matter is purely Machiavellian in nature; that the ends of economic prosperity justify the means of subjecting innocents to dehumanizing conditions. For this reason, the governments of these same nations do not prioritize research into pollution-related issues, nor do they subsidize or encourage researchers to delve into these dilemmas.

This cannot be the case in the modern era, however. Mankind no longer lacks the technology to promote environmentally sustainable and safe industrial practices. We have no excuse in allowing for the annual annihilation of 8.4 million individuals within poor nations, no matter the economic benefit. To justify the loss of such a tremendous
The amount of innocent life by delineating economic benefits is immoral, dystopian, and overall absurd.

The Journal of Health and Pollution, a journal of peer reviewed research and news published by the Blacksmith Institute, gives a voice to the local researchers of the undeveloped nations where pollution-related illnesses are a poignant problem. The journal provides a ubiquitously accessible platform from which local experts may present their findings to the international community.

From a source that tracks the number of research documents contained in the Scopus database produced by country in the field of environmental science, the United States had well over 300,000 documents, whereas countries such as Cambodia, Zimbabwe, and Senegal had fewer than 1,000. What the Journal of Health and Pollution allows for are individual experts within poorer nations to present their findings to the broader international community, promote awareness of the environmental issues afflicting their nation, and ultimately encourage international aid and support in dealing with and ameliorating environmental problems.

To focus on the environmental quandaries of impoverished nations is to focus on the overarching environmental ailments plaguing the human race. With 8.4 million deaths occurring as a result of pollution-related illness, and nearly all of these deaths occurring within underdeveloped nations, the research on these nations needs to be brought to the international spotlight.

If the international community is presented with the indisputable research from local experts, they may be more willing to provide support to the poor nations seeking to develop their economy. International aid to these nations in the form of supporting initiatives to develop sustainable environmental infrastructure will be more economically efficient in the long run, as modernized environmental practices are almost always more cost-efficient in the long term.

The Journal of Health and Pollution is allowing for the publication of invaluable information and research, the dissemination of which is sure to save millions of lives, and better the state of environmental sustainability on a global scale. The harsh pollutants within poorer nations has caused their researchers to lose their voice, but the Journal of Health and Pollution is slowly clearing the air, allowing those with thoughts of import to speak once more.

- http://www.enn.com/press_releases/4288
- http://www.journalhealthpollution.org/
- http://www.ipsnews.net/2014/06/in-developing-world-pollution-kills-more-than-disease/
- http://www.eh-resources.org/timeline/timeline_industrial.html
Correlation between Diabetes and the Ice Age

By Taylor Dodge

Many different things can cause a disease. The causes may be genetic, environmental, or perhaps both. But surprisingly, diseases such as sickle cell anemia may have kept people alive throughout the course of history. Although sickle cell anemia caused almost 200,000 deaths in 2013, its deadly characteristics also helped protect people against malaria. Diabetes appears to have played a similar role during the Ice Age.

Diabetes is a medical condition in which the body is unable to produce enough insulin, leading to increased blood glucose levels. There are two types of diabetes: type I and type II. In type I diabetes, the body simply does not produce insulin. Ten percent of individuals afflicted with diabetes have this variety. Type II diabetes, which ails 90 percent of diabetes sufferers, is caused principally by behavior.

Despite the life-threatening conditions of diabetes, it appears to have kept people alive during the Ice Age. One theory argues that those who lived in Northern Europe over 12,000 years ago were able to adapt to the frigid climate as a result of high blood glucose levels caused by diabetes. Due to some individuals' inability to produce insulin, they possessed elevated blood glucose, which would allow cells to keep from freezing over at lower temperatures. Such an abnormality would have guarded against cold death. The onset of diabetes could therefore have saved many people from freezing to death in the glacial conditions.

However, very theory has its skeptics. Some argue that this theory does not account for the autoimmune complications and early that diabetes brings, especially during prehistoric times. A rebuttal to that accusation claims that life expectancy was hardly longer than 25 years during that time anyhow. Since diabetes eventually lead to death, it did allow them enough time to reproduce, something those without the disease did not live long enough to do.

Dr. Kenneth Story, a biochemist at Carleton University in Ottawa, studies the wood frog and how its body reacts to colder climates. During the winter, as its skin begins to freeze, the liver excretes excess glucose into the bloodstream and lowers the freezing point of the blood. The frogs freeze over during the cold months, and then thaw out in the summer. Humans first respond to cold by shivering. Then, the body begins to burn a special type of fat called brown adipose tissue, which generates more heat for the body. In order to produce that heat, the body must have high levels of glucose, for which insulin is not needed. People who had developed diabetes were therefore much more equipped to generate body heat and to survive in the freezing temperatures.

Although more work must be done to prove a correlation between diabetes and prehistoric survival, this theory could show diabetes to be the first disease evolved to protect humans from a swiftly changing climate.

* http://www.medicalnewstoday.com/info/diabetes/
Road Crossing Efforts Protect Jersey Amphibians

By James Duffy

When the first warm rains of spring arrive in the frosty woods of New Jersey, some of the forest’s most charismatic—and most seldom seen—inhabitants awaken and journey to ancestral breeding pools. But in an increasingly fragmented habitat, their awakening is not always a pleasant one.

We speak of a class of animals whose lives are at once familiar and foreign: amphibians. And while the basic facts of amphibian biology—chiefly that most species begin life as aquatic tadpoles—are well known, many would be surprised to learn of the spectacular migrations undertaken by these common New Jersey residents.

Several species found in New Jersey habitats, such as the spotted salamander (pictured) are known to engage in “explosive” nocturnal migratory events. When conditions become sufficiently spring-like (warm temperatures and heavy rain are key), the populations of these usually inconspicuous animals march in the hundreds or thousands to temporary ponds they use for breeding, known as vernal pools.

While these massive nighttime movements are both spectacular and an effective predator-avoidance technique, they fail to protect against a major factor of the modern day: the automobile. In the densely populated states of the Northeast, the routes to vernal pools are often crossed by roads. When a migration event occurs, a single vehicle may kill dozens of these slow moving animals in a single pass. Leaving significant portions of species’ breeding populations crushed on the pavement, the effects of road mortality can be truly devastating.

Conservation groups have not sat idle as this phenomenon occurs. In 2002, the Conserve Wildlife Foundation of New Jersey (CWFNJ), in partnership with the New Jersey Endangered and Nongame Species Program (ENSP), began formally coordinating volunteers to be a physical presence on roads during migratory events. Armed with fluorescent vests, flashlights, and clipboards, these dedicated teams patrol roads in “hotspots” where amphibians are known to cross in large numbers. The task is simple enough: to pick up amphibians as they enter the roadway, and bring them to the other side. Species tallies are kept throughout the night, providing valuable long-term population data.

While these efforts are valuable tools for engaging the public and reducing road mortality, they are in many ways a last resort. The danger posed to volunteers working on dark and rainy roads is apparent. Most critically, the success of road crossing projects depends on the physical presence of volunteers. This is not always possible when volunteer numbers fall short, or when migration hotspots go undiscovered. Such programs also cannot serve amphibians like the marbled salamander, whose migrations occur in the fall, outside the monitoring season. For this reason, the search for long-term solutions rages on.

Environmental groups and government entities have proven close partners in this effort. When possible, road closures can prevent any road mortality for at least a handful of nights. In addition, several New Jersey localities are exploring the feasibility and effectiveness of road culverts, which would allow for amphibians to pass under roadways at any time of year.

The most comprehensive effort to overcome habitat fragmentation for amphibians and other wildlife will likely be the New Jersey ENSP’s “Connecting Habitat Across New Jersey” (CHANJ) initiative, which aims to maintain habitat continuity by connecting habitat fragments and guiding land management policies throughout the state. Initiatives such as this, which aim to connect habitats for free wildlife movement, are perhaps the best long-term strategies for protecting New Jersey’s wildlife—including its amphibians.

Interviews with MacKenzie Hall (Endangered and Nongame Species Program biologist) and Kelly Triece (Conserve Wildlife Foundation of NJ biologist)
http://www.state.nj.us/dep/fwv/ensp/fieldguide_herps.htm
http://www.conservewildlifenj.org/protecting/projects/amphibian_crossing/
http://www.conservewildlifenj.org/blog/category/amphibians/
http://www.conservewildlifenj.org/protecting/projects/amphibian_conservation/
http://www.dec.ny.gov/lands/51925.html
As diplomatic relations between the United States and Cuba are restored, the small island country of over 11 million people will experience an influx of American tourists not seen since before 1960 when the embargo was enacted by President John F. Kennedy. The changes, such as allowing tourists, were set into motion by President Barack Obama and will occur gradually in multiple categories. Economic improvements set into motion in the 1950s to make use of Cuba’s rich ecology, for example will have to wait for Congress’s approval. Tourism, however, will see the restrictions loosened for a number of esteemed scientists that have been waiting to get in for years to study such an important Caribbean habitat.

Past the tourist traps, bars, and beaches one might find in any given country, there are large swathes of almost untouched wilderness. The sounds emanating from these forests are not too dissimilar from the uniquely Cuban syncopated drum beat in that it cannot be found anywhere else. A yellow and brown striped woodpecker called Fernandina's Flicker is one of 371 species of birds found on Cuba with a quarter of those being endemic to the island. In addition to the native species, millions of migratory birds have been defying the United States travel ban on Cuba as they migrate through the Caribbean. Warblers and Osprey alike make their home in Cuba's forests and backyards as a respite from long flights and in-flight meals.

Scientists are very interested in what kind of diet migratory and native birds find on the island, along with understanding the overall habitat. Unfortunately, with the economic and travel restrictions in place, critical persons and equipment needed to study the island have been almost impossible to get a hold of. Cornell Ornithologist Inigo-Elias explains, “They don't have money to buy gas, to be able to move. Or they don't have the trucks to go to the field.” The economic sanctions completely eliminated the possibility of visiting scientists to cover these costs. Of course these restrictions are why Cuba has such a rich environment in the first place. Without the economic sanctions that came with the regime change, Cuba would have certainly continued developing as it had in the 1950s when it was called, “The Las Vegas of The Caribbean.” Instead of a rich and diverse habitat, Cuba might have golf courses and hotels. This is still entirely possible with the warming relations. The embargo was a double-edged sword, and the people of Cuba have suffered for half a century, but without the sanctions, the environment in Cuba would be the norm instead of the exception in our society.

With more and more news of improving relations between Cuba and the United States, Doug Rader is hopeful that more scientists like himself can get access to Cuba's rich ecology. As a marine biologist with the Environmental Defense Fund, Doug has been to Cuba more than 30 times, and describes the breathtaking scenery, “There are peaks that are more than 6,000 feet high, plunging deeply into the sea that goes 20,000 feet deep.” Cuba also contains many cloud forests, “...that house an incredible array of lizards, painted snails and birds.” Cuba is home to many protected lots and coastal zones as described by Mr. Rader as a result of strong environmental laws and outside sources alike. This incredible preservation is the other side of the economic sword used on Cuba about a half century ago. Without the cessation of U.S. funds, who is to say whether or not the environmental laws put into place would have stayed, or even passed with so much pressure to extract wealth from it?

Regardless, the fact remains that Cuba has an incredible natural wealth ready to be explored by scientists with funds from the United States when and if Congress allows the President's proposals to move forward. The same pressure that existed before the embargo against Cuba in 1960 will be applied as relations improve and economic restrictions are loosened. When the embargo was enacted by President Kennedy, there were hidden costs and benefits to the Cuban people and that same premise applies to their reversal by President Obama. The lure of wealth is tempting and the Cuban people could surely benefit from some of it. If Cuba handles the improved relations in the right way, the tourists and Cuban people alike will still be able to hear the distinct sounds of their island's inhabitants wherever they go.

Harvard Fossil Free Divestment Campaign Escalates

By Ariel Schwalb

Two years ago, the campaign to divest social institutions from the Top 200 largest coal, oil, and methane gas companies took off on hundreds of college campuses throughout the world. So far, 26 universities have committed to fully or partially divest within 5 years. The campaign is in its infancy and has yet to reach its true potential of sending a message to politicians and the fossil fuel industry that it is wrong to profit from destroying the planet. 350.org, the climate action nonprofit that leads the movement and facilitates student activists and university administration through the process, is teaming up with other environmental organizations, like the Better Future Project, to put pressure on the school with the largest endowment of $36 billion: Harvard College.

Harvard has at least $79 million direct investments in fossil fuel companies, and its campaign’s success or failure to obtain divestment will influence the rest of the college, city, state, house of worship, and other campaigns. The administration has refused to even meet with the campaign leaders over the issue, so divesters have radicalized the movement from organizing rallies to more forceful tactics. From April 13-18, campaign organizers are urging students, alumni, and others to participate in “Harvard Heat Week,” which they are hoping will be a week-long civil disobedience sit-in of 50-100 people at a time around Massachusetts Hall to block the President and other from getting into their offices.

Thirty high-profile alumni, including Natalie Portman, Cornel West, Maya Lin, and Robert Kennedy Junior, have signed an open letter to the administration urging for divestment, comparing this moment to the one decades ago when students urged their schools to dives from Apartheid in South Africa. “Divestment is effective,” said the letter, “While we can’t bankrupt the oil companies, we can start to politically bankrupt them, complicating their ability to dominate our political life.” Divest Harvard is also in the process of launching a fossil-free fund for alumni, which will hold alumni donations until the school agrees to make a commitment to “cleaning up” their endowment.

To approach the problem from an even more unique and compelling direction, seven of the divesters have formed a group called the Harvard Climate Justice Coalition, which is trying to sue Harvard for mismanagement of charitable funds. They also claim that Harvard intentionally invested in abnormally dangerous activities, which resembles a strict liability, but is still unprecedented in court. The first trial to dismiss the case was February 20th. The plaintiffs were also “Future Generations,” meaning anyone too young or not yet born to fight climate injustice and the college’s inertia. The judge dismissed the case, refusing to grant the students standing, but the group is now in the process of appealing to a higher court. It seems that the Harvard community will not be backing down until they get the results that they believe they need to see.

Under the Dome: A Documentary on China’s Air Pollution

By Morgan Lewis

On February 28th a new and rather stirring documentary made its way onto the Internet and into the view of the China’s public. The film Under the Dome received more than two hundred million views out of approximately six hundred million people with internet access in China before the Shanghai Propaganda Department issued the following statement, “Media and websites of all types and levels...must absolutely discontinue coverage of the documentary “Under the Dome” and its creator.” Under the Dome lasted less than a week online before it was completely removed from the Internet (Gardner). The removal of such a video sparked anger amongst many. But like one Internet user on Weiblo said, “Some people have the power to completely smother Chai Jing’s Under the Dome on the Internet, but don’t have the power to smother haze in this country.”

The documentary, narrated and created by former news reporter Chai Jing, uncovers a problem that has long had an audience but no public lead - China’s air pollution crisis. Throughout a hundred and four minute film Chia Jing displays graphs, short clips, statistics, pictures, and interviews. She discusses things from carbon black to benzo(a)pyrene. But what is perhaps the most moving part of the documentary has nothing to do with the hard facts. Chia Jing tells a story of her daughter, woven throughout the documentary, that pulls on the heartstrings of the Chinese public. Her daughter born with a tumor, Jing relays her worries as a mother raising a child in a city of pollution. Whether her daughter’s condition is directly related to pollution is unclear. What is clear though is that her story has given people exactly what she wanted it to – connection.

Under the Dome received comparisons to Al Gore’s ‘Inconvenient Truth’ and was also stated as China’s ‘Silent Spring’ by the new minister of environmental protection, Chen Jinging. Every now and then there is a film that grasps the hearts of people and calls for change. Many feel Jing’s documentary does just that. The facts that Jing provided for her audience on China’s pollution problem were not the main topics she planned to get across nor was the information provided intended to be explanatory for a public who already had a general idea of issues associated with air pollution and the like. Instead, Jing takes a subject such as pollution and gives it power through personal experience. From facemasks to no-school days, this documentary hits a very sensitive spot to the livelihood and health of China’s people. But, this is not all Jing tries to get across. Under the Dome is also a source whose intention goes far beyond awareness and instead questions the advancements China is making to manage such an issue.

Five days after Under the Dome was released Premier Li Keqiang told the National People’s Congress that, “Environmental pollution is a blight on people’s quality of life and a trouble that weighs on their hearts. We must fight it with all our might.” The day after that comment, Under the Dome was removed from the Internet. Although the fight for China’s “war against pollution” is publicized as a serious matter, it is unclear to the public exactly what steps they are taking to manage this issue. Jing questions throughout the documentary why the government has yet to create and implement effective environmental laws and enforce those already established. A question the public has already been asking themselves (Gardner). “It’s tens of million of ordinary people,” Jing says, “One day they say ‘no.’ I’m not satisfied. I don’t want to wait. I’m not going to shirk the responsibility. I’m going to stand up and do something. I’m going to do it right now. At this moment. At this place” (Mufson).

Chai Jing asks the public to stand up and address these questions together. Whether Under the Dome will indeed continue to progress the movement in China’s air pollution crisis is up for question. What it has done though is ignite a spark amongst the people. Now it is their job to decide if they utilize it. For further reference, Chia Jing’s documentary continues to progress the movement in China’s air pollution crisis is up for question. What it has done though is ignite a spark amongst the people. Now it is their job to decide if they utilize it. For further reference, Chia Jing’s documentary can be found on youtube.com with full subtitles.

The Impact of Plunging Oil Prices on Solar Energy

By Rishi Jaggernauth

A glut of American crude oil from new and improved drilling methods including hydraulic fracking has resulted in the steepest decline in oil prices since 2009. Although falling gas prices have been a boon to consumers at the pump, there has been some concern that oil prices will not only affect drilling operations in Texas and North Dakota, but also impact the continued development of solar energy in America. However, a closer look at the nature of the uses of petroleum in America and the relationship between the two energy sources that the impact may be less dire than expected.

Petroleum has been phased out for electricity generation in much of the United States and has been used primarily as a transportation fuel. Even with oil prices reaching under $50 a barrel for the US benchmark West Texas Intermediate, the use of oil for electricity production is prohibitively expensive, with little existing infrastructure to capitalize on price volatility. While oil has not played an important role in electricity generation for quite some time, another fossil fuel has emerged as a key player over the past decade: natural gas.

The growing reliance on natural gas for electricity production throughout the United States is a greater threat to the viability of the solar industry in the near future. According to the Energy Information Administration, natural gas provided 27% of the total electricity generated in the United States in 2013. New EPA regulations on coal plants and the success of hydraulic fracturing and drilling across much of the United States have led many proponents to promote natural gas as a “bridge” to cleaner methods of electricity generation.

Despite the continued decline in the cost of solar power, natural gas appears to be a more immediate obstacle to the continued adoption of solar energy across the United States. Many of the public utilities making headway into solar energy rely on natural gas plants for their electricity generation needs. This existing reliance on natural gas as well as the limited number of large-scale solar installations in construction has stymied the use of solar energy for large scale energy production. With natural gas prices reaching new lows and a limited appetite politically for continuation of existing tax credits and federal loans, it may take some time before large scale solar installations return to the United States.

A brighter spot for solar energy is the continued progress towards grid parity. The rapid and sustained decline in the cost of manufacturing solar panels has continued to make rooftop solar energy more feasible across the United States. Deutsche Bank analysts project that solar energy will reach grid parity in 36 states by 2016. Conversely, any sustained increases in natural gas prices or supply shortages may help spur greater demand for alternative sources of electricity generation. Despite some existing headwinds in the near future, there appears to be signs of a radiant future for solar energy in the United States.

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Florida: How to Use Another Name for Climate Change?

By Christi Capazzo

Climate change is a controversial topic that has become a regular focus in the mainstream media as carbon emissions worsen and concerns grow over fossil fuel versus alternative energy. However, the science and problem of climate change is not the main topic. Instead the perception of climate change continues to be a top focus between those who advocate for action against climate change and global warming and those who doubt that human activity is the source of the problem.

Florida governor Rick Scott’s office has supposedly banned the Florida Department of Environmental Protection (FDEP) from using the term “climate change” and other terms related to it when referring to the science behind the issue. The ban is not an official policy but state officials had been warned about using terms such as “climate change,” “sea level-rise”, and even “sustainability.” A more recent development shows that a Florida scientist was even told to remove the term “climate change” from a report that she had written about how climate change affected a food-borne illness she was studying. As a coastal state, Florida is threatened by beach erosion and flooding and Governor Scott has spoken about solving these issues but he does not take a definitive stance on the subjects of climate change or global warming. In regards to the policy on the supposed ban, Governor Scott and his administration deny that such a policy exists. Again, the policy is not official allowing them to deny but state workers attest to verbal communication that these terms should not be used.

The controversy in the Florida situation has little to do with the science of the topic, but instead presents an obstacle to the discussion of climate change. By removing the overarching terms and almost universal definitions, the field of climate science faces a wall in effective communication. An article in the New York Times warns against aimlessly labeling people who accept of doubt climate science. However, the Florida case is a situation where the speech surrounding the topic is being threatened to the point of harming open and free discussion of a current topic. Rather than openly discussing the terms for climate science or climate change, it seems that Florida’s government is putting more red tape on the topic. Whether or not you accept climate change, restriction on the topic’s speech does not encourage productive discourse.

The next phase in this longstanding issue is to see how Florida will handle the situation as more state workers step forward on the ban. If it proceeds, this may set a harmful precedent for other states to establish rules on the discussion of climate science. For four years, the ban has functioned as an unspoken restraint on those that work at the state level. It does not seem to impede on their work as long as they tweak the wording on official documents. But now that the situation has come to light, it raises a concern on the hidden influences that may be affecting the discourse of climate change not only in Florida but in other states. If this is a common practice, one can only hope these other situations are also brought forward on such an important topic as climate change.

Sources:
Although we are a diverse university, with students and professors representing a variety of states and even nations, we have all heard about the idea of global warming and the effects it may be having on our planet. There are, however, still many skeptics that do not believe in this phenomenon, although we can see evidence by observing the many endangered species that have lost habitat and resources due to global climate change. For example, through observing the polar bear and the changes occurring in its environment, we can see how global warming may be affecting the planet and give insight into what we can do to prevent its loss. It has been understood that one way the polar bear may be experiencing global warming is from the carbon footprint, and the only way we can go about preventing further change to the bear’s habitat is through a reduction of that footprint.

The carbon footprint is a hypothetical measure of carbon dioxide that an individual releases into the air through daily activities. Carbon dioxide is not necessarily bad, as it helps the growth of plants in our ecosystem and makes sure that the sun’s rays heat the planet. The problem, however, is that there is more carbon dioxide hovering around our atmosphere than is needed by our vegetation, and humanity is adding to the dilemma. The more carbon dioxide released into the atmosphere, the more difficult it is for the sun’s light rays to exit the planet’s surface, causing it to heat up in areas that it should remain cold. This warming, in turn, affects species like the polar bears.

One basic resource that the polar bear needs to survive in such a cold, harsh environment is its food. The main source of food for polar bears are seal that live next to them in cold waters. Polar bears “fish” for their seals on top of sea ice, a layer of ice that forms on the surface of the water that polar bears can walk on top of. Because seals typically like to dwell under sea ice, it is a hotspot for polar bear feeding. When sea ice is not present, due to warming, polar bears are able to swim up to one hundred miles without taking a rest in order to find their food. This method does not allow the polar bears to catch as much food, but it is still enough for them to survive. The rising temperatures due to increasing carbon footprints all over the world are affecting the polar bear’s habitat. They are melting the sea ice that the bears rely on every fall and winter to find their food. Scientists say that at the rate ice is forming and melting around their habitat, it will only be a few more decades before the white fluffy bear we know and love may go extinct.

Reducing the carbon footprint does not just save polar bears, but our own lives. As a society, we must continue to find alternative forms of energy that does not release excessive carbon dioxide. Just as well, we must not use energy in such wasteful ways. Turn off a light before leaving a room. Turn off the engine if you are waiting in your car. Do not take more food than you can eat. Small things, like getting involved with a local environmental organization or doing some research about the energy you use, can go a long way in helping our battle not just to save polar bears, but also to preserve our planet for future generations.

It is well known fact that the effects of climate change will have a serious impact on wildlife throughout the world. There is already evidence that polar bear habitat in the Arctic is decreasing on a yearly basis and that their hunting seasons are becoming significantly shorter. The beautiful coral reefs are becoming bleached as sea temperatures rise, and ocean acidification is not allowing new reefs to form. Invasive species, such as the deer tick and the fire ant, are expanding far from their natural habitats into new regions, all because of increasing global temperatures.

It is known that almost every species in the world contains parasites. They utilize their host for resources, protection, and transportation, and have the ability to transmit diseases from host to host. Therefore, they are an important factor in understanding how the rest of the species will survive in the future. Recently, a new model developed by Princeton University researchers has the ability to predict how parasite life cycles will change as a result of climate change. The model takes into consideration the two parts of a parasite's metabolic process: the temperature change in the environment where the parasite resides and the parasite's body size. If these two factors are known, scientists will be able to understand how well a specific parasite will survive in altered climates. Lead author and postdoctoral researcher Péter Molnár says, “our framework is applicable to pretty much any parasite, and utilizes established metabolic patterns shown to hold across a wide variety of species.”

The Princeton model was able to predict what might happen to parasites as global temperatures rise. According to the model, those parasite species with a high fundamental thermal niche, those that live in hotter areas, will most likely die out. Parasites with a lower fundamental thermal niche will prosper and migrate to new regions away from the equator. Ryan Hechinger, a parasite ecologist from the University of California-Santa Barbara, adds that the model also applies to parasites that infect humans. Plasmodium, the protozoan that causes malaria, is an example of this. Knowing the life cycle of the mosquito, the carrier of Plasmodium can potentially be used in this model to predict the future range of malaria.

There is another consequence, however, of increasing temperature on parasites. A 2006 Pennsylvania State study found that increasing temperatures may cause higher parasite prevalence and intensities. This is mainly due to the parasite free-living stages developing faster under harsh conditions. Increased temperatures will also result in a host reproducing more, which allows their young to be more susceptible to parasitic infections.

Molnár’s research is also investigating the recent range expansion of a nematode into the arctic, which utilizes muskoxen as its host. This example emphasizes the possible shift that parasites might encounter in the near future. It is very important to understand these shifts, for they have the potential to bring new diseases to new places. There is a need for more research on this subject matter so humans can be prepared for the slew of unintended outbreaks in response to climate change.

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Between the effects of climate change, deforestation, urbanization, and many other human-induced environmental effects more and more species are becoming endangered. One of the many endangered species of today is the Pangolin. Not only are all eight species of pangolin endangered according to the IUCN Red List, but they are also believed to be the most illegally traded mammal. This is an impressive title in the worst way, and with the amount of illegal trade of wildlife taking place, it seems absurd that at the top of this list is an animal that most people have never heard of.

Pangolins are mammals that look like scaly anteaters and they are found in Africa and Asia. These creatures are nocturnal and eat insects such as ants and termites by digging in the dirt with their curved claws. When faced with a predator, pangolins curl up into a ball and are protected by their sharp outer scales. These ant eater-esque animals are docile and fairly uncharismatic, so it seems odd why they would be so valuable on the black market.

The reasoning behind this is that the meat is served as a delicacy in Asia, and there is a belief that pangolin scales have medicinal value. There has been a common trend in Asia to sell exotic animal meat and to use other parts of them for curing illnesses: from enhancing male sexual performance to cancer (for example shark fins used in soup or rhino horns used in medicine). One of the reasons behind this trade is the interest in showing status by eating an exotic animal; this has increased in China as their economy has expanded. Secondly, ancient Chinese medicine is culturally prevalent. The unfortunate part is that pangolin scales, which are believed to have curative properties, are actually made of keratin, which is what human hair and nails are made of. For this reason all the effort and money spent on pangolin scales seems unnecessary. Consumers of these products genuinely believe in these medicines, and an understanding of this cultural upbringing is necessary to make sure that the consumers are not judged unjustly.

Pangolins go from the wild to consumers through the efforts of poachers. While pangolins defense mechanism (rolling into a ball) is weak against human predators, their capture is difficult due to the low number of pangolins, their nocturnal sleeping patterns, and solitary lifestyle. After a lot of effort, hunters in Indonesia are believed to receive $18 to $27 per kilo. Pangolins can weigh anywhere from 1.5 kilos to 33 kilos. A high level international trader may sell them for $265 per kilo and a restaurant may sell them for $350 per kilo. There is a clear inequality in the distribution of pay in terms of work input. This leads to impoverished hunters attempting to find as many pangolins as they can, so they can make decent money. This monetary need is what keeps this industry alive, like so many other damaging practices.

One positive story about the pangolin though is that a man named Suryatin in a village in Indonesia has managed to change past pangolin hunters into present pangolin protectors. He does so by explaining the ecological importance of the creature: without the pangolin there is an increase in ants. These ants eat the sharinga trees, also known as rubber trees because they produce a milky substance used to make rubber. Without the pangolins to maintain the ant population, a valuable resource may become spoiled due to ant infestation. Suryatin has the opportunity to explain this because he buys pangolins for full price from the hunters. While it does seem a bit overly optimistic that he is changing these people’s ways through their environmental interest, advocating for pangolin conservation by explaining environmental impact does seem like an effective tactic, although well-paying alternative jobs for hunters, as well as a shift in cultural view of the pangolin is probably the more effective way of saving this endangered species.

Sources:

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One of the best parts about being a SEBS student is the array of resources we have to attain knowledge, both in and out of the classroom, about how to live sustainably. With classes ranging from Introduction to Human Ecology, to give us a ‘shock and awe’ awareness of human environment interactions, to Jr./Sr. Colloquiums that cover topics covering Risk, Health, & Safety, Wellness & Behavior, and Agroecology we, as students, are indoctrinated into an understanding of sustainability. Sadly, with so much information to be passed along from professors to students, there are ways we can live sustainably that may have eluded us; the choices we make for ourselves after we pass away contribute to the sustainability of the world.

For millennia it has been common practice for humans as a culture to bury their dead. Of course these religious practices such as Hinduism and Jainism where it is common to burn the body of the deceased. However, a new practice is starting to gain momentum without religious constraints in which individuals can choose to have a positive impact on the environment after death. This project is called Capsula Mundi and was “created to promote the realization of green cemeteries in [Italy]”, which would plant a tree on top of a dead body located within an egg shaped, starch plastic, capsule. The decomposing body will individually provide nutrients to the soil which will help “relatives and friends look after it when death occurs” but also help to create long lasting and spiritual forests.

Through conventional cemetery practices it is common that a “one acre parcel of land could support one thousand ground burials.” And, with a U.S. population tipping over thirty million and a world population approaching seven and a half billion people, it is easy to understand the limited function cemeteries provide. Through the creation of the Capsula Mundi project and elimination of mass burial sites, a system can be created that reduces land use and instead creates resources. By choosing the location of their burial site and the tree they wish to grow around them the deceased can contribute to the sustainable choices society makes after they pass away. Furthermore, with the project being launched over dozens of countries, individuals can choose from trees such as Oak, Olive, Ash, and Willow. Of course these cultural shifts do not come easily and often require legislation support.

Currently in Italy there are laws in place that restrict this type of burial. First and foremost “only wood can be used to make coffins” and secondly “cemeteries have to be protected in a controlled and closed area” which both create issues for the specific goals of the Capsula Mundi project. These outdated and unsustainable laws have the potential to hinder the growth of this goal! However, with a greater community awareness of the project coupled with continued action by those who support the cause it is likely that this new form of burial will soon be common practice. To learn more about the Capsula Mundi project or get involved please visit the Capsula Mundi website listed as a resource below.

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The annual New Jersey vintners’ symposium “Grape Expectations” featured a discussion on the emerging agricultural, meteorological, and technological marvel that is the NEWA program. Conducted primarily through collaborations from the Northeast Regional Climate Center and land-grant universities such as Rutgers University, Cornell, and University of Vermont, NEWA [or: Network for Environment and Weather Applications] is a weather-tracking service that makes use of both historic and real-time data taken from locations near or on-site in farms in the northeast in order to advise farmers on the times of the year wherein lie optimal growing conditions and periods of danger or threat to various crops.

The brainchild of Cornell researchers and Chatsworth growers, the original intent of the program was to find a way to predict levels of leaf wetness. Wet leaves are vulnerable to fungal infections especially, as spores can adhere to the leaf by floating in water and spores can spread as spore-bearing water is dropped from an infected plant onto a healthy one. NEWA has since expanded to monitoring patterns of temperature, wind, and rainfall through probes on or near agricultural sites, compiling this data, and computing advice for growers based on present and past values.

New Jersey, not called “The Garden State” for nothing, has a vast array of local crops produced within its borders. New Jersey also claims the greatest weather density in the US, with temperature, wind speed, and rainfall patterns varying immensely from one region to the next. Such variety allows New Jersey to offer myriad local produce, but also makes it ideal for studying weather patterns’ conditions and their effects on agriculture.

As the name “Grape Expectations” may suggest, the vintners’ symposium focused mainly on the use of this technology for improving wine through better prevention and treatment of plant diseases, which may be affected by the weather. Fungal diseases in particular are influenced by the weather, and weather models can help map and predict spore dispersal, infection count, spore adhesion, spore germination, penetration, and colonization, to name a few features. Even insects’ prevalence is affected by the weather, making these models useful in predicting insect presence, life cycle, proliferation, and activity as vectors. Insects and fungi do not only affect vineyards, so this database has great potential for application to any and all agricultural activities involving the rearing of plants, from grain to fruit. NEWA has made an effort to compile a variety of weather models from many farms in order to be of service to farmers of as many varieties of crops as they can. Their website, included in the references, is free to use and intuitive in its design. As knowledge of the program spreads and more locations seek inclusion, we can look forward to still more information to be gleaned and the strategic use of this resource by our farmers.

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Outdoor Festivals and the Environment

By Tom Armstrong

It’s that time of year again; spring has finally arrived and with the new season comes the start of another year of outdoor music festivals. These festivals such as Bonnaroo, Coachella, Burning Man, and Firefly just to name a few, are multiday festivals with music, camping, and a whole host of other fun activities. While many outdoor enthusiasts do in fact enjoy these outdoor festivals, the environmental implications of having said festivals cannot be understated. However, for those of us that enjoy music, the outdoors, and the culmination of various activities at outdoor music festivals, all hope is not lost! Many festivals are coming to realize the immense environmental impacts these festivals have and are working to curb their environmental harms.

Festivals, typically located on large farms have massive energy, water, and land demands. These multiday events require energy inputs for music amplification, food trucks and other vendors, lighting, and a wide variety of other uses. Water is always in high demand as well, with tens of thousands of people converging on a single property in rather warm months. Aside from the drinking demands posed by the large crowds, the overnight camping crowd requires water for showering and bathrooms. In addition to the energy and water demands, festivals inevitably create a lot of waste that must be disposed of in the proper fashion.

Fortunately many of the companies that put on these festivals are environmentally conscious and are constantly looking for ways to lessen the environmental impacts of these massive events. Bonnaroo has a whole page on their website dedicated to sustainability, including various efforts they put forth in trying to be have less of a negative environmental impact. Such efforts include the donation of one dollar from every ticket sale to be put towards sustainable site improvements on the host farm, the usage of 100 percent compostable food service items, and a car pool contest.

This prominent issue has created such a buzz that non-profit organizations have been started such as Global Cool Foundation and A Greener Festival in an effort to reduce environmental harms associated with outdoor festivals. A Greener Festival is “committed to helping music and arts events and festivals around the world adopt environmentally efficient practices.” The Global Cool Foundation targets societies ‘trendsetters,’ in this case music festivals as a means of creating a more environmentally friendly society. While the environmental effects of hosting a outdoor festival are abundant so are the efforts to reduce environmental harms.

With the increasing prevalence of outdoor music and entertainment festivals the environmental harms associated with hosting such an event cannot be over looked. Luckily many of those involved in putting on such festivals as well as the festivalgoers are outdoor enthusiasts and environmentalists. With the continued commitment of many festival organizers as well as the various non-profits, festival goers can rest easy knowing that while the potential for environmental harms is enormous during festivals, the effects are being at least partially mitigated through sustainable practices, hard work, and education.

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Breathe happy, rat lovers! In a recent study in the Proceedings of the National Academy of Sciences, some serious rat fans put together some facts that may shed new light on the true culprit of the small feat known as the biggest drop in population Europe’s ever experienced. Somewhere around 75 to 200 million people died, and humanity has overall disapproved of the rat’s involvements in the whole thing. While they were not the direct vectors for the disease, the fleas the rats were thought to harbor carried the bacteria that caused the plague. Since the good folks living in Medieval Europe practiced such high-class hygiene tactics as “not bathing”, this problem was exacerbated. The fleas spread the disease to the population by biting them, but the disease was spread primarily from person-to-person contact by working in tandem with other disorders such as typhoid and smallpox. So those danged rats that got here via the Silk Road were the cause of death to a lot of innocent peasants, by that logic!

But as I mentioned earlier, some climatologists have analyzed the conditions that were present around the time of the black plague in Europe, and have found that they were not conducive to large amounts of rats. Rats require warm conditions and little precipitation, but the Black Death was a time of polar opposite conditions. This means it wouldn’t have been possible for the rats to be the true vectors of the disease, since they wouldn’t have been able to reproduce in the numbers necessary to spread to humans. But you know what other small mammal carries the same type of flea that existed in vast numbers back then, who has up until now remained “cuddly wuddly” and not “population destroyer”? And, who, just coincidentally, absolutely loved those climate conditions? None other than the true face of horror itself: Gerbils.

What the climatologists have discovered is that we have been completely lied to by an entire species of mammal, which have fooled kindergarten teachers across the nation with their fat cheeks full of lies. I mean, honestly, how many people associate gerbils with biological outbreaks of catastrophic proportions? There are a lot of reasons why this horrible profiling arose: there’s a negative stigma toward rats and pestilence, and at the time, that was seen as the main cause of all disease. It just seemed like rats were the easiest victim to pin the wrap on, because of their ability to carry fleas and disease. Of course, the scientific method should strive to find the truth, even if it means shattering the image of a previously clandestine species of cuddly vermin. So on behalf of us humans, we’re sorry, rats.

Sources:
http://www.cdc.gov/plague/
An adaptation is a mutation or genetic change that helps an organism survive in its environment. Further, adaptations can come in many different forms. Some animals, like the mimic octopus, can change their appearance to blend into the seabed. Others, like the stick bug, blend into trees by mimicking a stick in their physical appearance. Some animals, however, achieve an even more clever way of adapting to their environment. The cinereous mourner, a bird of the Amazon rainforests, has adapted so that when young, it mimics a species of toxic caterpillar. This type of mimicry is called Batesian mimicry, which can be generally thought of as a harmless organism developing traits similar to those of a dangerous one. It benefits from this likeness by making itself unattractive to potential predators.

Scientists have long theorized that the bright orange color of the cinereous mourner’s chicks wards off predators. The color resembles a fruit found in the area that is typically uneaten by the potential predators. In 2012 it was proposed that the animal was mimicking the characteristics of an unknown animal, but it was hard for anyone to confirm. A Californian scientist was able to locate the bird’s chicks in a wild nest and observe their behavior. His findings suggest the birds are mimicking a giant (and rather fluffy) caterpillar that sports toxicants on the tips of its hairs.

The bird seems to imitate both the color and hairy appearance of the caterpillar. The caterpillar has orange hair with white long tips; the feathers on the bird also sport unusually long white tips. Surprisingly, even the behavior of the chicks seems to imitate the toxic insect. These baby birds slither back and forth much like a caterpillar would, with the effect being a superbly un-birdlike appearance. When the chicks are in close proximity of the mother, she will then voice the food cue, and the chicks raise their head to feed.

While scientists are not sure how this adaptation came about, they do understand how it was advantageous; this disguise allows the chicks to survive the first three weeks of life, up until their wing feathers sprout. The cinereous mourner nests up to twenty days, which is far longer than other birds of this size. Some theorize the lack of feedings these birds receive as chicks is the main reason for this extended nesting time. Their color also allows the chicks to blend into the leaves and trees, which aids in their survival during hours spent unsupervised by their mother. Though new information on this bird is interesting and exciting, researchers are still scrambling to obtain a larger sample size to reach any broad claims on how this adaptation came about.

Sources:
http://www.dogonews.com/2015/1/30/baby-birds-mimic-toxic-caterpillars-to-fool-predators
Few industries are more notorious for being waste-intensive than the restaurant industry. In terms of energy input, a restaurant can waste significantly more than what it sells. From excess food that is ultimately discarded to packaging by-products, there are many parts of the daily production process in a restaurant that can lead to waste. While recycling programs can help reduce the waste output of some restaurants, the costs of composting make it difficult to deal with the high volume of food scraps in a sustainable way. There are quite a few restaurants that compost their food wastes and brand themselves as sustainable. However, this often leads to a higher cost of production and ultimately a higher cost incurred to the customer.

A restaurant owner in Chicago has set out to establish an eatery than runs on sustainable practices, produces minimal waste, and is relatively inexpensive compared to other restaurants with a similar structure. This restaurant, “Sandwich Me In” is owned by Justin Vrany, who has worked in the restaurant business for over 15 years. It was the unsustainable practices that he witnessed during those 15 years that led him to set out to achieve this goal. Vrany mentions that in a typical restaurant, about 8 gallons of waste are produced per hour. He then claims that his restaurant also produces 8 gallons of garbage… but over the course of two years.

So how does he do it? To achieve his goal, Vrany runs his restaurant on sustainable energy and buys food from local farms that is packaged in minimal material. Additionally, everything from used frying oil to food scraps are repurposed. Vrany takes any recyclables from the restaurant to his home where he can sort them and make sure that they are disposed of properly. They also serve their meals on pieces of paper and do not use any styrofoam. In addition to reducing trash and recyclables, Vrany is also passionate about reducing water waste. He mentions that the dish room in a typical restaurant will go through about 10 to 15 fills of a sink per day, but his restaurant only goes through 1 to 2 per day. In addition to operating his own restaurant this way, Vrany also wants to spread his knowledge and methods to the public. This past summer he developed his own composting program for the public and he provides advice for any other restaurants that are aiming to reduce waste. To top it all off, the 8 gallons of garbage that this restaurant produced over the course of two years was donated to an artist that intended to incorporate it into a sustainability themed sculpture. This makes Sandwich Me In officially a zero-waste restaurant.

Vrany is an inspiration to those who wish to reduce waste and be more sustainable, all while keeping costs low. Many, especially restaurant owners, are often discouraged to practice these activities because they believe it will increase costs and reduce profits. As Vrany demonstrates, this could not be further from the truth, as there are many sustainable practices that can actually reduce costs by a significant degree.

Sources: https://www.youtube.com/watch?v=uwg6ci2V6-4
The traditional love and desire for ivory has been and still is threatening the existence of elephants through illegal trading of their tusks. China has been growing in affluence, so the desire for ivory by many is now possible, thus the demand for it is growing rapidly. China is currently the world’s largest market for elephant ivory in the world, but this fact may be change because China has just imposed a one-year ban on all carved ivory imports.

Before this temporary ban, China had adopted the conditions of an international ban on ivory in 1989. This allowed China to trade domestically and currently China has about 150 licensed ivory shops. A majority of the supply for these shops comes from the Chinese stockpiles of ivory, and those stockpiles increased when, in 2008, the Chinese were granted an exemption from the international ban, and received one delivery of over sixty tons of ivory from various African countries. Aside from the stockpile, the Chinese were also allowed to import ivory obtained through legal trophy hunting and “limited personal amounts of carved ivory obtained after 1975 from Zimbabwe and Namibia”. These “exemptions” can be accented by the fact that the price of ivory is going up, and since 2010 the price of it has tripled, and the desire to sell is increasing. Poachers are using more advanced weapons and are now known to kill off entire herds. In 2012, there were two shipments of ivory confiscated in Hong Kong that amounted to the tusks of just over six hundred dead elephants. Globally, over 20,000 African elephants were killed for their tusks in 2013, and according to the Convention on International Trade in Endangered Species, that hunt left a population of around 500,000 elephants.

The State Forestry Administration oversees China’s wildlife trade and announced that in an effort to combat the intense criticism over the growing demand for ivory in China, a one year ban on carved ivory would be put into place. The ban became effective in late February, and officials say that the suspension is going to be used as a test to see if a ban would truly be effective in protecting the elephant populations. Before the Chinese government continues to make these types of moves, they are going to evaluate the effect of on elephant protection. Before this ban, China had already started making moves to target the black market trading of ivory; a critical start was the public destruction of 6.8 tons of confiscated ivory last year.

Conservationists are happy but not satisfied. Since carved ivory is only a small fraction of ivory imports, they say that this temporary ban is a good step, but that it will not actual-
Economy or Ecology?

By Will Shinn

Slavoj Žižek is a Slovenian psychoanalyst and philosopher best known for his critique of ideology through popular culture—most frequently Hollywood films. He has written over 30 books on a variety of philosophical and psychological topics, and has given a number of talks on these subjects in an attempt to further connect with his audience. Žižek offers some of his thoughts on human relationships with the environment and the issue of climate change in an article submitted to The New Statesman in 2010. It bears a striking resemblance to something Human Ecology students might read, but from the perspective of Žižek who tends to focus on the shortcomings of our current ideology.

Žižek opens with the point that humans are more capable than ever of controlling nature, but are also just as much at its mercy. At the time the article was written a recent volcanic eruption in Iceland had stopped air traffic for days. Flights were grounded because volcanic ash could have choked out engines with disastrous results, but after a week or so of no flying there was mounting pressure to allow flights back into the air. Despite there being little to no change in the quality of the air, it seemed that scientists were saying that it was indeed safe to fly, contradicting earlier concerns. Žižek attributes this shift in position to the influence of airline companies on scientists for business purposes, as the companies were losing money for every flight that was delayed. This focus on the economic impacts of a naturally occurring event such as a volcanic eruption seem to allow for a deviant use of science, which is a problem if we are hoping to remain objective (or as objective as possible). Žižek’s next point seems to contradict this, but is a useful thought when considering the implications of scientific findings. He states that science is hopeless and not the proper focus for improvement of the human condition, but then doubles back and claims that science will be the only way to dig ourselves out of the hole we are in.

Perhaps what he is really trying to say here is that it will be the direction in which we take science that is most important when dealing with the future and climate change. In other words, science cannot save us, it can only be part of the solution. We are responsible for the decisions that are made and for the actions that are carried out, and sometimes relying on science alone can be dangerous. Some might that scientists have very recently failed us, as they are now finding that sea ice is melting at a much faster pace than originally projected, wholly shifting the need to reduce emissions and change our lifestyle. It is not unheard of that scientific projections are misleading and we need to be wary of how we utilize scientific information when dealing with the health of humans and the future of the planet. While he does not use the term “precautionary principle” explicitly, Žižek urges that we be much more careful moving forward, even if our knowledge is limited.

The fact that we cannot say exactly how much we affect global climate should be reason to tread lightly rather than produce until we find our limits. There isn’t necessarily equilibrium in nature that can be found again after a tipping point is reached. It might be helpful to try and replace any ideas of order in nature and instead think about the natural world as nothing more than a “big series of unimaginable catastrophes” as Žižek says in the Unexamined Life. It is alarmingly dangerous to feel that we can simply go about business as usual just because we understand our world fairly well—the margin of ignorance that remains can result in a lack of foresight when making decisions for the future, which can in turn result in totally preventable catastrophes.

A final point to take away from one of Žižek’s interviews that applies well here is the issue of disavowal. Žižek claims that there are many people who believe man made climate change as fact, but do not act as if they believe it. These people have disavowed beliefs, beliefs that are more or less half-hearted. The reason for this, says Žižek, is that we look outside and see that the world is still there as it was yesterday: there hasn’t been much perceptible change. The terror in this is that things are actually changing quite rapidly, and we may not act until it is far too late.
Slavoj Žižek would probably ask us to rigorously evaluate our beliefs when we leave the house every morning, just to be sure that we really understand the probable impacts that climate change will bring. We cannot hold these views half-heartedly; doing so will result in many small catastrophes that could have easily been mitigated had we been more cautious. While science can tell us what sorts of actions might be appropriate, we should still be skeptics and treat a situation with care rather than push the limits of a habitable environment for economic purposes. Money does not have much relevance, after all, without a people to spend it.

New Discoveries and the Mystery of the Origin of Earth’s Oceans

By Chloe’ Lewis

Where did Earth’s oceans come from? At what point in geological time did the oceans of the Earth come to be? For many decades, the geological community has debated answers to these and other longstanding questions. One thing we do know for sure is that the oceans came long after our planet formed. Some scientists and researchers believe that Earth’s oceans were the result of a comet or asteroid collision, bringing with it ice particles that supplied a substantial amount of water to the dry planet. Other theories include planetary cooling, the gradual leakage of stored hydrate minerals into earth’s rocks, volcanic activity, and many others.

As of June 2014, after a new discovery, all of these and other theories may very well be officially laid to rest. Steve Jacobsen and his team at Northwestern University discovered a reservoir that is three times the size of any of the earth’s oceans hidden deep beneath the earth’s core. It is possible this reservoir is the source from which all water on the surface of the earth is derived. Jacobsen and his team used 2000 seismometers to study seismic waves generated by 500 earthquakes to determine what lies deep beneath the surface. By measuring the speeds of the waves at various depths, the team could surmise which type of rocks the waves were passing through.

At one point during the study, the seismic waves slowed down upon reaching ringwoodite (a layer of hot blue rock 700 kilometers beneath the mantle of the Earth’s core), which indicated that the waves were passing through water as well as rock. Jacobsen investigated these events prior to this field discovery when he conducted in-lab experiments using ringwoodite to explore the wave results in the event that they encountered water. The temperature and pressure at the depth of this rock layer is ideal for water to seep out.

Jacobson hypothesized that the hidden water could function as a buffer for the oceans on the surface, which would explain why they have remained the same size for millions of years. Jacobsen’s study supports findings of a previous study conducted by Graham Pearson of the University of Alberta in Edmonton, Canada. In that study, transition zone diamonds that were carried to the surface through a volcano were found to contain ringwoodite. This was the first strong evidence supporting the idea that there was a substantial amount of water found within the transition zones of the Earth’s interior.

However, Jacobsen’s study has only been conducted within the boundaries beneath the continental United States. More studies will need to be conducted to definitively determine where else on the planet this phenomenon occurs, and if it occurs globally. Even so, this exceptionally exciting discovery does much to excite our curiosity surrounding the truths of our planet, our solar system, and the life within it.

Sources:
http://earthweareone.com/massive-ocean-discovered-towards-the-earths-core/
http://time.com/2868283/subterranean-ocean-reservoir-core-ringwoodite/
FEELING SALTY THIS WINTER?

By Melissa Mertz

Is the environment starting to feel a little “salty” about how humans are handling the snow? This past winter in the New Brunswick area alone should be an indication of the amount of de-icing the United States needs to do in order to keep businesses open, school in session, and people safely in their usual driving and walking routines. In a year, the United States will toss more than 22 million tons of sodium chloride on our roadways—about 13 times the amount of salt than is used by the entire food processing industry in that same amount of time (Slate). That means about 137 pounds of salt is thrown down for every American (Smithsonian). All that salt has to go somewhere, though, which is an environmental issue that must be addressed to ensure that the ecological impact does not outweigh the importance of roadway clearance.

Roadway salt is composed of about 40 percent sodium and 60 chloride, but ferrocyanide and iron are also used as anti-caking agents (NHDES). All those minerals find their way into the environment via rain runoff, melting snow and ice, splashing from vehicles, and spray from wind (NHDES). There are no agents in the environment that enable any disintegration or break down of the chloride ions, so that chloride builds up in all types of waterways, including the groundwater used for drinking. According to a Minnesota study, 70 percent of the salt applied to roads stays within the region’s watershed (Slate). This amount of salt in drinking water is a health issue for those with sodium-restricted diets and leaves the water tasting awful for others. Several New Hampshire public water supply wells have been replaced or abandoned due to chloride contamination (NHDES).

An even greater reason for concern is the surrounding environment, which is highly impacted by chloride ions. Water containing higher levels of sodium chloride creates a higher water density, which makes that water settle to the deepest part of a water body unable to turnover. Therefore, dissolved oxygen may not reach the bottom layers and nutrients may not reach the top layer. Wildlife may not be able to be supported in the deeper layers since it is void of oxygen. An estimated 40 percent of the country’s urban streams have chloride levels that exceed safe guidelines for aquatic life, largely because of road salt (Smithsonian).

The cost to clean up United States roadways is about $2.3 billion per year (NPR). Since this is such a massive allotment of funds, there needs to be more attention to detail in order to protect the environment. Government agencies are trying methods like adding liquid to the salt in order to keep it more in place or, optimally, using the minimum amount of salt necessary to de-ice (NPR). Hopefully the last snowstorm of the season has passed and government agencies have time to innovate the best new methods of salt control for next year.

http://des.nh.gov/organization/divisions/water/wmb/was/salt-reduction-initiative/impacts.htm
http://www.slate.com/articles/health_and_science/the_green_lantern/2010/02/salting_the_earth.html
EPIB Trail Mix

Calling all to the Climate Justice March!

Who: Divestment, SEA, Take Back the Tap, Black Student Caucus, and other organizations

What: We will be marching for climate justice & action

Where: From Douglass Student Center to Brower Steps

When: 4 PM to 5 PM on Wednesday, April 22nd

Why: It’s Earth Day! Come join us in solidarity.

We will be chanting, cheering, holding signs, and listening to some amazing speakers. Please wear green or blue!

Rutgers Fossil Free Divestment Campaign:

Please follow us @rufossilfree on Instagram, share why you want Rutgers to Divest from Fossil Fuels! #rufossilfree #imagine divestment

Divestment will officially be meeting with the Joint Committee of Board of Governors and Trustees in May. We will be making the case for divestment and will share your message with those who control the endowment. Roughly 3% of our endowment is invested in publically traded coal, oil, and gas companies. Now is the time to participate!

Take Back the Tap: Rutgers is participating in the nationwide Tap-A-Palooza contest! Text “I <3 Tap” to 69866 and reply with your Rutgers email address to help Rutgers win $1,000 for new fill stations!

Dr. Clark’s News of the Weird:

LEAD STORY -- Man's Best Friend

Researchers are now preparing a study seeking to confirm that dog slobber, by itself (and not just the psychological advantages of playing with and petting a dog), might provide human health benefits (such as relief from asthma, allergies and inflammation). Specialists from the University of Arizona and University of California San Diego point to existing evidence of the comparative healthiness of dog-owning families and suspect that canine saliva may have unusual probiotic value. [San Diego Union-Tribune, 3-17-2015]