



A Letter from the President

Our 8.8 square mile watershed, with its naturally reproducing trout population, is fighting the impacts of past abuses and new challenges. Sandy has forced us all to look at our rivers, streams and overhanging tree canopy with new eyes. The Gallows Run has shown its resilience in its ability to bounce back from unforeseen challenges.

Our small watershed became ground zero for blowback to Governor Corbett’s over-reaching Act 13, a blueprint for the industrialization of the entire Pennsylvania landscape with no zoning exclusions anywhere. This past year the GRWA partnered with the Delaware Riverkeeper and PennEnvironment to present the consequences of the gasmen coming to town. Anyone in the overflow audience at Palisades High School will remember our friends from Dimock telling their stories and displaying their post-drilling well water.

Nockamixon Township was among the group of municipalities that first challenged the Act’s abridgement of the Pennsylvania Commonwealth’s Constitution’s protection of our air and water. Our representatives in Harrisburg responded to the public outcry and moved to pass a moratorium on gas drilling in the Newark Basin. We have achieved a state of limbo which seems a victory compared to those gas-boomed areas in Marcellus Shale outside of the Delaware Basin.

The GRWA has also been in the stream cleaning up storm debris and instituting new stream and aquifer monitoring programs. We have been in the Middle and High Schools running workshops and at local community days taking orders for rain barrels. We have been working with our partners in townships, county and state to conserve valuable open space properties in the watershed. We have been attending local government meetings to be a continual voice for environmental conservation and stewardship on the township level. With our Township partners, we will continue to implement evidence-based groundwater management.

We welcome your stories and photos in response to this issue of Upper Bucks Futures. And your support, of course, makes all this work possible.

Yours in Conservation,

Todd Stone
 President of the Gallows Run Watershed Association

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Art for Conservation 5th Annual Art Show

Who: Artists of Gallows Run, Art for Conservation

What: 5th Annual Art Exhibition

Where: Rising Sun Farm, 207 Church Hill Road, Kintnersville, PA

When: Sat. September 28, 5-7:30 pm & Sun. September 29, 2-5 pm

Cost: These events are free

The Artists of the Gallows Run celebrate their 5th annual Art for Conservation Show. The seventeen artists, who make the Gallows Run Watershed their home, pursue a mission of public awareness, land preservation and environmental education through art sales. 50% of the profits from sales of art go directly into land conservation in Nockamixon Township. Art for Conservation showcases their work in a historic bank barn in the verdant, rolling hills of rural Upper Bucks County. The theme of this year's exhibit is "Observations in a Changing Climate", an interpretation of change in a post-Sandy world.

The artists are: Alana Balogh, Bill Brokaw, Ron Brown, John Mark Courtney, Joe Danciger, Russell Drisch, Robert Hansen, Linda Jenny, Pat McCutcheon, Paul McGinn, Sharon Mendelson, Robert Noonan, R. Woolston Rapp, Karl Schwartz, Reinhold Schwenk, Steve Sears and Todd Stone. Bucks County abstract painter Pat Martin will be this year's guest artist. Musician and painter, George Thompson will play his unique blend of jazz, pop, blues guitar at the Saturday evening celebration.

After Rising Sun Farm, the exhibit moves upriver to Nurture Nature Center, located at 518 Northampton Street in Easton, PA, from October 5 - November 1. A celebratory reception at Nature Nurture will be held on Thursday, October 10, 6-9 pm.

As the last stop on the tour, and to interface with our local school students, the exhibit will then move to Palisades High School on November 13 through January 8, 2014. Environmentalism and education go hand in hand.



Black Constellation by Russell Drisch



Todd in the River by Bill Brokaw



Act 13 Litigation Update: Waiting is the Hardest Part

By Jordan Yeager

Many area residents spent much of last year following the Act 13 case. To recap, Nockamixon Township and a handful of other municipalities from around the state have been fighting to win back the ability to apply local zoning rules to oil and gas operations, just like all other land uses. The General Assembly and Governor Corbett removed local zoning authority via Act 13 of 2012. The Township has also challenged a provision that would make it mandatory for the Pennsylvania Department of Environmental Protection to grant waivers from setback requirements for well-sites near streams.

In July 2012, the Commonwealth Court ruled in favor of the Township, declaring Act 13's zoning provisions and mandatory waivers of stream setback requirements unconstitutional. The Governor and other state agencies appealed to the Pennsylvania Supreme Court, which heard oral argument in October 2012. At the time this was written, the Township is still waiting for a decision from the Supreme Court.

To receive a favorable verdict, the Township only needs a tie vote (at the very least) as it would mean lower court's decision remains in place. Until recently, a 3-3 decision would be a victory for the Township because there were only 6 justices on the Court. However, with the resignation of former Justice Joan Orié Melvin, the Supreme Court is about to be joined by Superior Court Judge Correale Stevens, who has been confirmed as the Court's seventh justice.

The impact of these changes on any decision in the Township's case is unclear. The Court could choose to hear re-argument or move forward without re-argument. Much is speculation at this time, and so we continue to wait to see what will happen.



Sand-Y Blasted: A Personal Story

By Marion Kyde

Last October's Sandy destroyed the interior of our woods, taking upwards of 200 trees in her wake, including many special native species that I had planted over the 28 years I have stewarded this Tinicum property. For some time, I couldn't even face making decisions about what to do.

I knew that I wanted all the woody material to remain on the property. Those wind-thrown trees and shrubs represented years of sequestered nutrients taken from the soil. It had to be returned.

Part of our property has been deer fenced for ten years. Inside the fence, a young mixed deciduous forest grew, some trees reaching 30 feet or more.

Here, I cleared and chipped some downed trees to get to the paths I built. Others trees were cut into sections and piled for critter habitat. The very center, where there were no paths, was left a jumble. The chips were used to rejuvenate the trails that weave in and out of the property.

To speed up decomposition, I drilled 400 holes in the log sections. 300 were plugged with three species of saprophytic mushrooms, two of which are edible. The fourth set of 100 was treated with Stump Buster (an inorganic acid). Some logs were left untreated.

From a totally wooded, shady property, an open, sunny area emerged. Given an opportunity to reforest with native trees, I planted 10 American chestnuts and 5 American elms in May. I added some oaks, a fantastic tupelo, two redbuds, two fringe trees, and some sumacs -- staghorn, shining, and fragrant. Throughout the sunny area I planted landscape plugs of fairly short-lived wildflowers -- magenta gayfeather, yellow Baptisia, purple summer phlox and white daisies. They'll provide a rainbow and compete with the weeds while we're waiting for the trees to reach shade producing heights.

Outside the fence was a different situation. Because it was accessible to deer, no understory had developed, and the destruction was nearly total. The tree crew was cooperative but dubious. They were used to chipping everything possible and hauling away the logs. It wasn't easy to convince them to remove all the branches, section the logs, and get everything into contact with the ground! We left several dead snags for the birds of prey, and my Cooper's Hawk has already claimed one of them for his own. Tis messy to be sure, but in twenty years, there will be a young forest on the site, much healthier than the monoculture of pines from before.



By Marion Kyde



Photo by Erica Burrell
Design

Understanding Changes in Our Weather Patterns: How does Global Climate Weirdness Effect Us?

By Stephen F. Donovan, Ph.D. (Member of Nockamixon EAC, and the BNT Groundwater Management Committee)

When studying water resource issues for our townships, one of the key factors to understand is precipitation. We need to consider the effect of climate change, such as: have we seen changes in precipitation events, what are the trends, if any, and what might we expect to see in the future? Then after looking at the trends in past weather events to better predict the future behavior, what might we do to prepare for the changes in weather behaviour and to mitigate any adverse effects? We will show local trends in weather, how that relates to our national weather, and how it relates to global weather.

There is much confusion about what is meant by the term 'Global Warming'. 'Global Warming' is an oversimplification and leads to misinterpretation of effects. There is much evidence that the world is warming ever so slightly. This increase is measured in a few hundredths of a degree per year, far to slight to be perceptible by personal observation. When the normal annual swings in temperature range from 0 °F to 100 °F, how could you possibly feel a change of 1/100 of a Fahrenheit degree of average increase from last year? At the same time, some areas are undergoing record heat waves and drought (the American Southwest) other areas are undergoing grater than average precipitation (the American Midwest and Northeast), and yet other parts of the globe are now undergoing unusual cooling (Europe).

“Global Warming’ is an oversimplification and leads to misinterpretation of effects. “

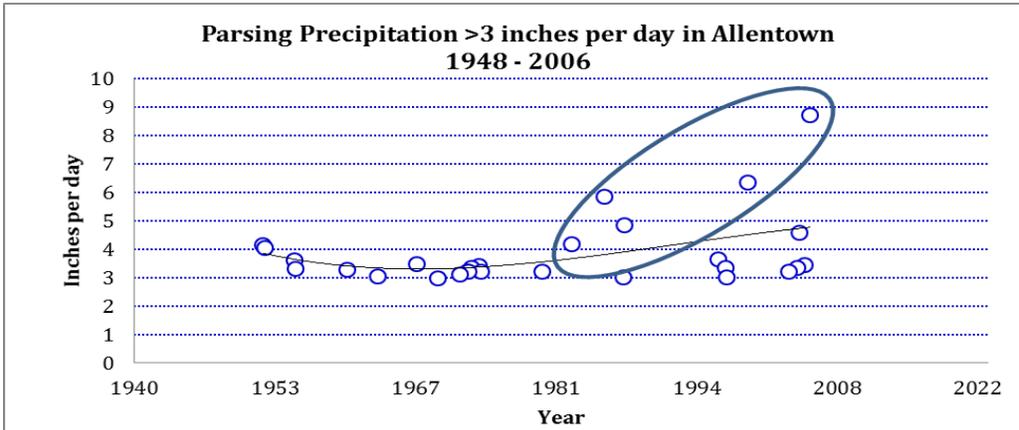
These simultaneously dissimilar events are not compatible with a simple understanding of 'Global Warming', but rather with a more nuanced view in the light of 'Global Climate Change'... or 'Global Climate Weirdness'.

Consider that an increase in air temperature and an increase in the temperature of the Gulf of Mexico, that the weather now has more energy and is able to hold much more water in the atmosphere than when it is cooler. Then an increase in the number, frequency and violence of extreme weather events is not surprising. Thus the most noticeable effects of a warming world may not be seen as an increase in temperature, but rather an increase in violent and erratic weather.

On the local level, we seem to be having 500 year floods every other year for the last decade and a 'Storm of the Century' every year.

We have years where there is little to no snow in the winter of 2011 and 2012, yet have devastating snow storms in October 2011 and 2012 that resulted in weeklong power outages. What evidence do we have in a change in precipitation patterns on the local level?

We looked at the rainfall records from the Allentown airport from 1950 to 2008 for the occurrence of precipitation that was more than three inches per day; we see more intense storms beginning in the mid-80's:



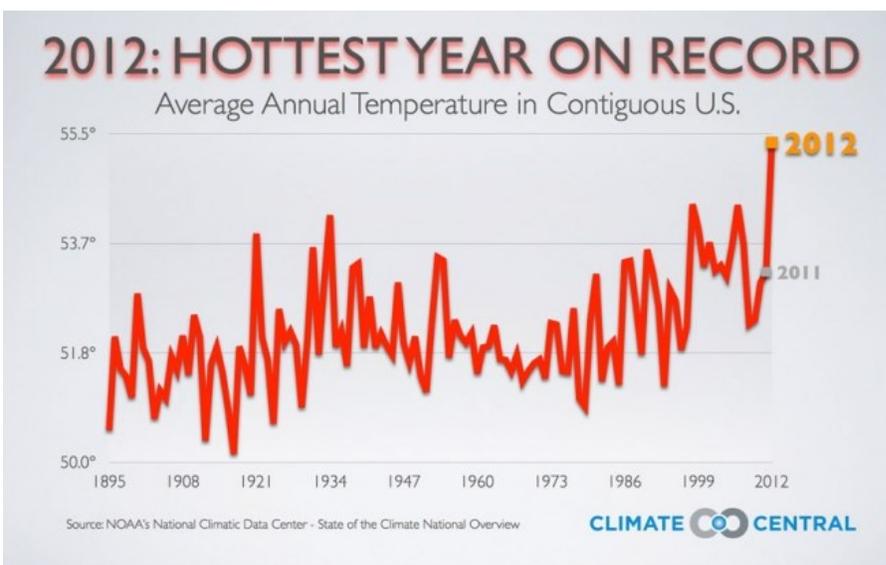
Graph courtesy of USGS:

<http://pa.water.usgs.gov/drought/indicators/precip/90day/Bucks90.gif>

When you type in the above link, you will get the now current precipitation departure from what would be expected for that time of the year. This is a 90-day moving average where we expect to get the highest precipitation in the summer and the least in the winter. The expected amount is the dotted blue line. Of note in this graph is that in April 2012 we were in the drought area, now in July 2013 we are off the chart in the opposite direction. This is typical of the now more common pattern of erratic variations in weather patterns.

We now expect highly variable weather patterns.

The results of analysis of the average temperatures in the US for 2012, and it was the hottest year since temperatures have been recorded:



Graph Courtesy of Climate Central

<http://www.climatecentral.org/news/noaa-2012-was-warmest-and-second-most-extreme-year-on-record-15436>

There is an impressive and informative 26-second video on the following link from NASA that shows the average temperature departures from normal mapped on the globe from 1880 to 2012:

<http://www.nasa.gov/topics/earth/features/2011-temps.html>

The data comes from NASA's Goddard Institute for Space Studies in New York, which monitors global surface temperatures. As NASA notes, "in this animation, reds indicate temperatures higher than the average during a baseline period of 1951-1980, while blues indicate lower temperatures than the baseline average."

So where what do we do with all this information? We need to expect, plan for and not be surprised by weird weather. It is just as likely that this winter we may get only a couple of inches of snow as six feet. It seems that the new normal is that it will not be normal. When you see a new extreme weather storm taking place, consider that with a warmer world there is more energy in the atmosphere, the storms will be more violent and more extreme.

This extreme event, (the current drought, record heat and fires in the Southwest, or a month of continuous rain causing floods in the Midwest, another blizzard of the century, or another storm of the century such as Katrina or Sandy), it is not an isolated event; it is a part of a pattern of non-typical weather. The major effect of climate change is not just warmer weather. It is the consequences of the warmer climate on the weather system producing erratic patterns. It is far better for us to have four storms that give us one inch of rain that it is for one storm to give us four inches of rain to recharge our aquifers. While Pennsylvania seems to be in a wetter trend for the last few decades, with weird weather, next year we could have a major drought, or a cold summer, or a frigid winter.

In planning for weird weather, we need to reconsider how we handle development so that we can control storm-water. We may want to use all the best management practices. We may want to recommend smaller lawns on hillsides to lessen sheet-flow during storms. We may want to recommend vegetation (bushes and shrubs) to retain the water long enough that the streams are not as likely to flood. We should be very sceptical with the siting of developments based on the extent of a hundred or a five hundred year flood line. When we are having a hundred year flood every other year, these terms have now lost any literal meaning. How many 'storm of the century' storms can you have every year? We need to plan for power outages lasting a week or longer happening every year or two. In short, we need to plan for the unexpected on a personal, municipal, state and national level.

The Gallows Run Watershed Association (GRWA) is an independent 501(c) 3 non-profit dedicated to protecting and improving the quality of the natural resources of the Gallows Run Watershed. We advocate on behalf of sound environmental stewardship, sustainable land management, and preservation of the rural character of the Watershed. Our tools include educational outreach, scientific research, active participation in the legal processes that effect local land use, and a strategic partnership with other organizations that share our objective.

Learn more about GRWA at our new website: www.grwa.wildapricot.org

Some other related links:

Global Weirdness:

<http://www.climatecentral.org/news/a-look-at-our-first-book-global-weirdness/>

<http://www.npr.org/2012/08/14/158756024/climate-weirdness-throws-ecosystems-out-of-kilter>

http://www.nytimes.com/2011/09/14/opinion/friedman-is-it-weird-enough-yet.html?_r=0

Climate Change:

<http://www.grwabucks.org/climate-change.htm#video>

<http://www.noaa.gov/climate.html>

<http://www.ncdc.noaa.gov/oa/climate/severeweather/extremes.html>

<http://climate.nasa.gov/>

<http://www.columbia.edu/~mhs119/>

The World Meteorological Organization (WMO) Report, The Global Climate 2001-2010, A Decade of Climate Extremes:

http://library.wmo.int/opac/index.php?lvl=notice_display&id=15110

Available online at: http://library.wmo.int/pmb_ged/wmo_1119_en.pdf

The Sixth Mass Extinction

<http://www.mysterium.com/extinction.html>

<http://news.sciencemag.org/sciencenow/2011/03/are-we-in-the-middle-of-a-sixth-.html>

<http://www.actionbioscience.org/newfrontiers/eldredge2.html>

<http://www.thedailybeast.com/newsweek/2013/05/06/the-sixth-mass-extinction-is-upon-us-can-humans-survive.html>

http://books.google.com/books/about/The_Sixth_Extinction.html?id=reogHQAACAAJ

****Notice****

This article is an abridged version for the black and white printing of Upper Bucks Futures. Please view the full article, which includes several colorful graphs, under "Upper Bucks Futures" on our website:

www.grwa.wildapricot.org

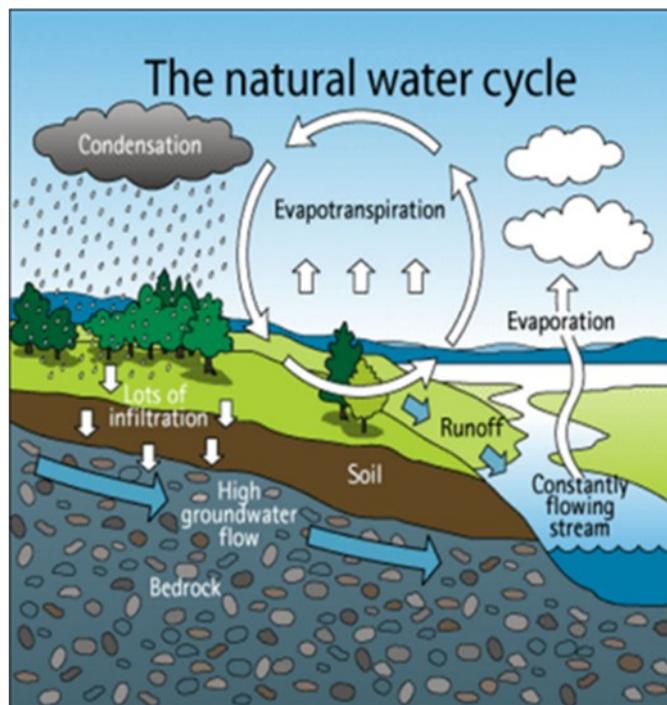


How to Assist the Revitalization of the Water Table Near Your Property

By Maureen L. Purcell, P.E., M.S. Sustainable Design

Water is a hot topic these days especially in our immediate area of the Gallows Run Watershed and Nockamixon Township. The quality and volume of our water wells has been in recent newspaper articles and has been a topic of distress for some.

Some experts consider water as the new “gold.” If that statement is only partially true, it must be understood. Viktor Schauberger, an Austrian forester from the early 1900’s and an expert on water stated, “The true foundation of all culture is the knowledge and understanding of water.” Our current societal culture is becoming increasingly more aware of this concept, hopefully not too late.



www.aucklandcity.govt.nz

Scientists and engineers have found that using methods to retain as much water on your property as possible is the best way to support a healthy natural water cycle. The rain that makes contact in your immediate surroundings should be collected or controlled to stay as close to the point of contact with the earth.

In an ideal natural water cycle the amount of rain converted to runoff is less than 10% of the runoff volume, roughly 50% of rainwater is infiltrated into the soil, and roughly 40% is evaporated into the air. Infiltration provides more water volume for water tables and drinking wells and evapotranspiration provides proper moisture content for healthy fauna, wildlife, and human habitats. This is extremely important in the Gallows Run Watershed and surrounding areas due to the large areas of bedrock that make it difficult for the water to be absorbed.

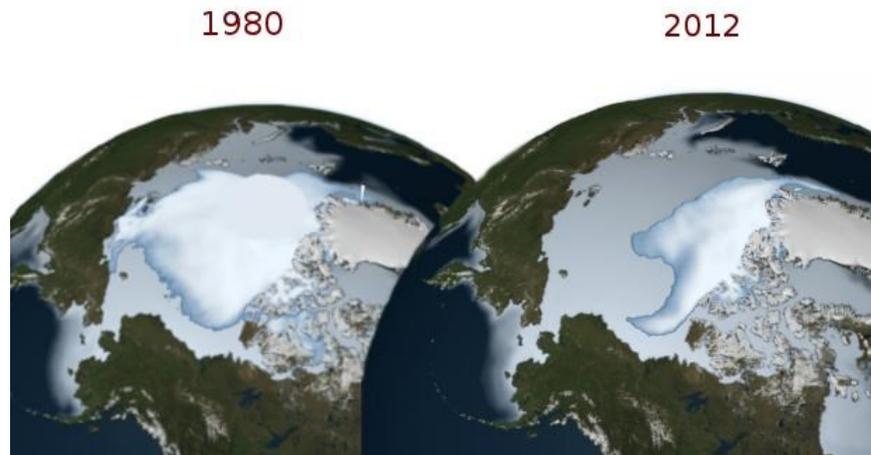
There are a handful of techniques property owners can implement to assist in protecting their water table and ultimately their drinking water. One of the best ways to assist the natural water cycle on your property is to increase the pervious surface areas. Some ways to add pervious surfaces are to add a green roof or remove macadam driveways and replace them with stone or pervious macadam.

Another way to control the water on your property is to divert your roof gutters to rain barrels, cisterns, or rain gardens. Rain gardens and bioswales naturally control water to slowly infiltrate into the soil and also filter the surface runoff. All of the mentioned water control methods contribute to a healthier water table by filtering the dirt from roof or impervious surface runoff and at the same time increase the amount of water collected on site and ultimately into your wells. These low impact water control methods support the natural water cycle as much as possible with the least amount of manmade impact to a site.



Introducing a Landmark Paper on the Feasibility of Using Wind, Water and the Sun to Provide All of Our Energy Needs

By Karl Schwartz



(NASA, Satellite image of the retreating arctic icecaps)

Ice is melting faster than new ice is being created, as greenhouse gases accumulate

Greenhouse gases come from natural sources, but today the major source is human activities, primarily from electricity generated by burning coal, oil and natural gas.

These and other emissions are warming the planet and are already altering our way of life. The process is accelerating and could reach a tipping point in our lifetime – prompting conscientious scientists to propose alternative ways to generate power.

Here's the thing about Carbon Dioxide (CO₂) – once it enters the atmosphere it lasts and lasts - 50 to 200 years. Because it has a very long “shelf life” it's prone to accumulation. Getting the levels back down will take a long, long time – generations, but only if we earthlings can change our ways.

Methane (CH₄) is the second most prevalent greenhouse gas emitted in the United States from human activities – such as the extraction of natural gas. The atmospheric shelf life of CH₄ is 12 years; notably its greenhouse effect is 21 times higher than CO₂ (EPA)

Thus, the paper by Jacobson and colleagues seems **the most important scientific proposal of our time**. However, the feasibility of the plan depends on public awareness of the dangers and costs of our continued dependence on fossil fuels – as no elected official will call for sweeping changes to an energy infrastructure without broad public support.

That the warming of our planet is taking place is evident by atmospheric and ocean measurements, satellite imagery, and by the number and intensity of extreme weather events. There is, “...near unanimous scientific consensus that greenhouse gas emissions generated by human activity will change Earth's climate” (McMichael et al. 2006).

Still, despite Sandy-like events, obstacles remain to public awareness about the causes and implications. These include reporting bias by the mainstream media, disinformation campaigns seeking to discredit scientists, the unaccounted for impacts and costs of fossil fuels and prevalent myths about the causes of climate change.

On Reporting Bias

A recent example of reporting bias was a failure by the mainstream media to adequately report a new milestone for our planet:

The global concentration of carbon dioxide in the atmosphere – the primary driver of recent climate change – has reached 400 parts per million (ppm) for the first time in recorded history, according to data from the Mauna Loa Observatory in Hawaii.

Notably, 350 ppm (also not widely reported) has been cited as a likely tipping point for climate change acceleration. Further, the media did not report on the comments made by NASA scientists on what this means for our way of life (NASA.gov).

On the Hidden Costs of Fossil Fuels

When weighing the merits of a new energy policy it's important to consider the true costs of doing business as usual – such as what it costs to rebuild our homes or of shielding coastal communities (Bloomberg, seawalls for NYC) from future damage due to extreme storms and rising sea levels.

As noted, virtually all scientists attribute climate change to human activities. The costs associated with global warming include crop damage from heat waves and droughts, the increasing number, size and intensity of wild fires, flood and wind damage from extreme storms (Sandy, tornadoes, derechos) and the spread of infectious disease as the range of insect vectors increase.

These costs are not added to the price of gas when we fill up our tanks, or deducted from the profits of the fuel industries... but these related events cost the public dearly nonetheless – increasingly. We are, in effect, subsidizing the fossil fuel industry when paying to repair or prevent damage from extreme weather events.



On Who to Trust

The energy industry understands the importance of public perception on what regulations may or may not govern their activities. These prosperous companies can afford to run ads again and again (today even on NPR “public” radio) describing only one side of the story – their side— so that regulations and incentives will favor their business plan and profit objectives.

“The Arctic sea ice may disappear in 20-39 years...” (e.g., Pappas, 2012).

In contrast the views of scientists must be tested (not just opinions held), and the prevailing scientific theory or prediction must be consistent with new facts that emerge from different research groups affiliated with recognized scientific institutions.

Regarding the scientific evidence on climate change, here are a few statements from the peer-reviewed published literature to consider:

The Arctic sea ice may disappear in 20–30 years unless global warming is abated (e.g., Pappas, 2012).

Above a certain temperature, a tipping point is expected to occur, accelerating the loss [of the ice] to complete elimination (Winton, 2006).

The Arctic is undergoing striking changes in climate. Regional near-surface air temperatures are rising at two to four times the global average rate (Screen and Simmonds 2010).

The summer of 2010 was the warmest in the previous 600 years in western Russia ($P > 0.99$) and probably the warmest in western Greenland and the Canadian Arctic as well ($P > 0.90$). These and other recent extremes greatly exceed those expected from a stationary climate, but can be understood as resulting from constant space-time variability about an increased mean temperature (Tingley, 2013).

Surface temperature reconstructions of the past 1500 years suggest that recent warming is unprecedented in that time (Marcott et al., 2013).

Let’s not take ourselves off the hook. We earthlings – growing in number and appetites - have a fondness for what’s big, fast and easy. Arguably, the energy companies are merely supplying what we desire. We need to consider the scale and energy-hungry human activities that take place continuously worldwide:

The human population growth of the last century has been truly phenomenal. It required only 40 years after 1950 for the population to double from 2.5 billion to 5 billion. This doubling time is less than the average human lifetime. The world population passed 6 billion just before the end of the 20th century. Present estimates are for the population to reach 8-12 billion before the end of the 21st century. (University of Michigan, Lecture)



(NASA, satellite image from space)

There's an urgent need for scientists to engage the public more, and to be given a voice in the mainstream media to explain the key findings and to address the myths that foster public confusion and government inaction. Here are some myths about the causes of climate change along with evidence-based responses:

Myth: That climate scientists are falsifying the data to win funding – “Climate Gate:”

On one of two independent reviews of the charges, Sir Muir Russell writes:

“Nothing that you have seen calls into question the scientific consensus on human-caused climate change. ... These disinformation tactics contribute to the public’s increasing confusion regarding the causes of climate change.”

Myth: That our planet is in a natural warming cycle and therefore there is no need to change our energy systems:

On this, ScenceTimes writes: *“past climate change actually provides evidence for our climate's sensitivity to CO2.”*

Myth: That cold weather and snow events disprove climate change:

On this, ClimateCentral.org writes: *“Looking at high and low temperature data from recent decades shows that new record highs occur nearly twice as often as new record lows.”*

Myth: That the cycle of the sun is causing climate change:

On this, Skeptical Science writes: *“An analysis of solar trends concluded that the sun has actually contributed a slight cooling influence in recent decades” (Lockwood 2008).*

Finally to the landmark paper, Jacobson and colleagues summarize their analysis nicely:

“This study represents the first effort to develop a plan for an individual state to provide 100% of its all-purpose energy from WWS and to calculate the number of WWS energy devices, land and ocean areas, jobs, and policies needed for such an infrastructure.”

Here experts in their fields have published for peer review an innovative plan to meet the energy needs of an entire state, making use of existing technologies – a plan that will not contribute to global warming or generate harmful air and water pollution.

It’s an approach that can make New York State a healthier place for the citizens to thrive and work – that can be a model for the world – a model that is urgently needed to help protect and preserve our way of life.

Some of what you will learn by reading the paper:

- How many wind turbines are needed off the coast of Long Island to generate 40% of the state’s energy needs
- How many jobs the conversion will create for residents of the State
- How energy generated by WWS during low demand can be stored for use when demand is higher
- Why natural gas extraction is not a suitable bridge fuel
- How the methane and natural gas footprint of natural gas compares to oil as a transportation fuel
- Why shale gas formations have larger methane emissions and therefore a larger greenhouse gas footprint than do conventional sources
- Why liquid biofuels (e.g., corn for ethanol) are not a good answer
- Why nuclear power and coal with carbon capture are also excluded
- The temporary role of solid biofuel and how to ensure reliability of the electric power grids
- How when sulfur dioxide emissions from coal are considered, the greater air-pollution health effects of coal become apparent

Peer debate will follow this paper, which will be constructive and science-based. Will the media follow the competing arguments adequately and present them in a fair way?

There’s reason to doubt that any such plan could be implemented on a timely basis without improved public education on this very serious matter... the reason for this piece.

Examining the feasibility of converting New York State’s all-purpose energy infrastructure to one using wind, water, and sunlight

Mark Z. Jacobson, Robert W.Howarth, Mark A.Delucchi, Stan R. Scobie, Jannette M.Barth, Michael J. Dvorak, Megan Klevze, Hind Katkhuda, Brian Miranda, Navid A.Chowdhury, Rick Jones a, Larsen Plano, Anthony R. Ingraffea
Stanford.edu: <http://stanford.io/1896hjF>

References / Acknowledgments

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- EPA Overview of Greenhouse Gases <http://www.epa.gov/climatechange/ghgemissions/gases/co2.html>
- Univ of Michigan: Population Growth over Human History http://www.globalchange.umich.edu/globalchange2/current/lectures/human_pop/human_pop.html
- Public perception on the warming of our planet by the Brookings institute: <http://bit.ly/1duoTYC>
- NASA scientists react to 400 ppm carbon milestone <http://climate.nasa.gov/400ppmquotes/>
- Independent Climate Change Emails Review
From cce-review.org on Climate Gate: <http://bit.ly/16AgDCq>
- Lenton, 2012, Arctic Climate Tipping Points, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3357822/?report=classic>
- On global warming – do your own homework because the media is sleeping: http://www.ncbi.nlm.nih.gov/pubmed?linkname=pubmed_pubmed&from_uid=23579678

Save The World... Grow an Oak!

By Bill Brokaw

OK, so maybe we can't single handedly stop tar sands mining or mountaintop removal, but anyone can grow a tree, or two or ten! It isn't rocket science (it's botany)!

Some of the easiest trees to grow from seed are nut trees like oak. Here's how.

1. Find some acorns.
2. Sprout 'em.
3. Plant 'em.

Think you can do it?

There are various types of oaks in this area. Some (white oaks, chestnut oaks) sprout (germinate) in the fall and some (red oaks, pin oaks) will germinate in the spring. Here is how you can start an oak tree.

Sometime in late October/November, go acorn hunting. You may find some acorns that have already cracked their hull and started growing a shoot, called a radical. Gather up a bunch of these along with any other acorns you can find.



By Bill Brokaw

Separate the early sprouters from the others. Prepare a small pot with loose soil for each one. Lay the sprouted acorn on top of the soil and press it in slightly. Take care not to break the radical. Prepare a nice place for these pots outdoors and be sure to protect them from ravaging mice and squirrels. A box with a screened top works well. Then just let them winter over.

For unsprouted acorns, a float test can help see if they're worth keeping. Some may be a little rotted or have worms chewing away inside. Just put them in a jar of water and see what floats. If an acorn floats it may indicate there is airspace inside the hull. Separate these and leave them out for the squirrels.

Let the sinkers soak for a day or so. Then mix up some soil with peat moss or a bunch of crushed leaves in bucket. Spackle buckets work great for this, especially if you have the top. Moisten the soil slightly, mix in the acorns, put the top on the bucket and leave it out in the cold for the winter.



By Bill Brokaw



By Bill Brokaw

A round March/April, check on your acorns to see if they've germinated. If so, give them each a pot of their own like you did with the early fall sprouters. Lay the acorns on top of the soil, water them lightly and let them grow.

Keep them moist and protected. After a short time the radical will work its way down into the soil, and new growth will start growing upward. Oaks have deep roots, so after your trees start growing transfer them from their starter pots to something bigger and deeper.

Now it is just a matter of taking care of you trees and watching them grow. Mice and squirrels become less of a problem as your trees age, but deer love them so be sure to keep them in a fenced-in area or on a deck.

You can grow you trees in pots all summer and then plant them in the fall or keep them for another year to get a little bigger before planting. If you keep them for another year, mound the soil up around the pots over the winter. This helps protect the roots from the hard freeze. I also like to bury my trees in leaves for a little extra protection.

When you are ready to plant, find a nice location with no overhead branches or overhead lines. Oaks don't mind a little shade, so it is not critical to be in the sun; however, they do grow tall, and you don't want them tangling in power lines or cables.



By Bill Brokaw

Remove the turf layer and then loosen up the soil down to a foot or so. Water your tree then remove it from its pot. Gently rough up the roots a little, make a small hole in the loose soil and place your tree in the hole. Be sure not to create a depression where water can collect but instead keep things level or even mound up the tree a little.

Put some mulch or crushed leaves around the tree while keeping some air space immediately around the base. If mulch is piled up, it could cause it to rot. Then put a nice fence around the tree to ward off the deer and watch your tree grow for the next 100 years.

For more information visit this website: <http://www.wikihow.com/Grow-an-Oak-Tree-from-an-Acorn>

And remember, you can't grow too many trees!

Aquaponics: An Innovative Opportunity

By Nathaniel Sibinga, Researcher at Brooklyn College

Food production is caught in the middle of a profound cultural shift in America. Growing awareness of the nutritional and environmental ramifications of the things we eat is changing the way Americans buy and prepare food. It's also changing the way scientists think about farming.

Beginning in the 1940s with the advent of the green revolution, scientists in this country have spent the last several decades finding ways to mechanize, automate, and increase the scale of food production. As the pendulum swings back the other way, however, scientists are looking at new ways to produce food. Aquaponics is an innovative technique that combines aquaculture with hydroponic farming. By taking an ecosystem approach to food production, aquaponics has the potential to produce greater yields – of both fish and vegetables – than conventional agricultural, all without any chemical fertilizers.

Aquaculture refers to the cultivation of aquatic animals, such as fish, shrimp or shellfish. Hydroponics is a technique by which plants grow directly in nutrient-enriched water without dirt. Aquaponics is the synergistic combination of the two, in which the weaknesses of one system become strengths of the other.

A typical aquaponic system features a fish tank connected to an irrigated growbed. Water is circulated back and forth between the two; in the fish tank, fish effluents fertilize the water, while in the growbed these waste products are broken down by nitrogen-fixing bacteria and then absorbed by the plants. Fish fertilize the water for the plants and the plants remove nitrogenous wastes before they can build up to toxic levels for the fish.

Aquaponics is more than just a clever way to combine fish and vegetables; scientists believe that it could hold the answers to two of the most significant problems facing the next generation of farmers in America and around the world. The first lies in its water efficiency. Population growth and climate change are projected to make fresh water an increasingly scarce and valuable resource in the coming century. Aquaponic systems are recirculating, meaning that the same water goes through the cycle again and again. This makes aquaponics the most water-efficient farming technique on earth – requiring

“Aquaponics is an innovative technique that combines aquaculture with hydroponic farming.”

as little as 5% of the water required for soil-based agriculture.

Aquaponics is also potentially ideal for a world of shifting demographics. Globalization and the economic development of China and India have brought Western culture and, more importantly in this case, Western diets to people who did not previously have access to them.



As billions of people enter the global middle class there is every reason to believe that their eating habits will shift away from vegetable-based peasant diets to the high protein diet that most Westerners are accustomed to. Without getting too technical, farmed fish can be a more environmentally friendly protein source (compared to red meat and poultry) because they are incredibly efficient at converting food into muscle. Ocean fish stocks are in decline worldwide due to overfishing; the oceans are simply incapable of supplying more fish than they already do. Aquaponics has the potential to be a viable, sustainable, and scalable way to meet this demand and fundamentally change the way food is produced.





Gallows Run Watershed Association

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Learn more about the GRWA

The Gallows Run Watershed Association (GRWA) is an independent 501(c) 3 non-profit dedicated to protecting and improving the quality of the natural resources of the Gallows Run Watershed. We advocate on behalf of sound environmental stewardship, sustainable land management, and preservation of the rural character of the Watershed. Our tools include educational outreach, scientific research, active participation in the legal processes that effect local land use, and a strategic partnership with other organizations that share our objective.

If you are interested in becoming a member, signing up to our email list and/or volunteering, please go to our website: www.grwa.wildapricot.org

OR mail your information to: GRWA Membership, P.O. Box 24, Kintnersville, Pennsylvania 18930

Name: _____

Are you interested in becoming a volunteer?

Email: _____

Check if yes