The WMHS Program just finished its program review last semester. We want to thank all the participants in this great effort to improve one of the best water programs in the country: Students, former students, faculty, executive committee, staff and of course, our review team that offer great reviews and recommendations. We look forward to work with you this year on important events that we have been planning such as the Water Poster Competition on April 2013 along with an outreach program Let’s Talk About Water movie event that will help our program as well as the community.

Congratulations to our Graduating Students

Prakash Khedun, PhD
Miae Ha, PhD
Michael Kuitu, MWM
Jaison Sanwald, MWM
Sandeep Patil M.S.

You are the pride of this program and the hope for water sustainability. Good luck and keep us posted on our Facebook page, The Water Program at Texas A&M, or on our website.

As the new year starts, the Water Program wants to wish you all a safe, healthy and happy new semester! May the joy and peace reach every and all of you, as well as your families here and abroad.

Email us at The Drop!
Announcing our new email for contributions, comments, and suggestions: thedrop.wmhs@gmail.com

Thank You and Congratulations!

April 24 will be the date in which the Water Poster Contest and the CUASHI Let’s Talk about Water Movie Event will take place. Save the date! Both events will be open to all TAMU students and will offer prizes to the best three posters. The movie will be “Last Drop of the Oasis,” sponsored by CUASHI and will be free to all students and the College Station/Bryan community.

Water Poster Contest
All students are encouraged to prepare a poster addressing a water issue or problem with suggested solutions. Posters will be judged by a team of faculty and water professionals. This is an opportunity to think creatively and effectively communicate your ideas to your colleagues and the public. Here are the requirements:

- Must be related to water
- One entry per student
- All authors should present (5 minutes max per student)
- Poster can be related to a class project
- No more than 3 students per poster
- Posters should be in a horizontal format and not exceed 36” in height and 48” in length
- Poster boards will be provided

Winning awards: 1st: $300; 2nd: $200; 3rd: $100

Place: Rudder Tower Exhibit Hall
Time: posters will be presented from 9:00 to 3:00 and voting, evaluating and awarding session from 3:00 to 4:00
Students interested should email Rosario@geos.tamu.edu with the following information to be able to register for the event:

- Name of participant(s) and department of each participant(s)
- Title of research presented
- Major of each participant(s)

Every poster will receive a number that will identify their poster and place to be located in the Exhibit Hall of the Rudder Tower.

Let’s Talk About Water CUASHI Movie
Students, water professionals and general public are invited to join our water movie of the year followed by a faculty discussion panel that will address water issues, challenges and proposals.

Movie: “Last Call for the Oasis”
Place: Rudder Theater (next to Exhibit Hall)
Time: 4:30-7:00
Any additional questions please email Rosario@geos.tamu.edu or thedrop.wmhs@gmail.com

The Water Management & Hydrological Science (WMHS) Program and The Texas Water Resources Institute (TWRI) and invite you to:

Water Daze Event
April 24, 2013
Winter Water Conservation in Texas

By James Sweeney

The impacts of the Texas drought of 2011 and its impacts are ever present on policy makers, planners, scientists and the general public. If we did not appreciate water shortage potential before, most of us understand it now. We have a sense that the relative water usage in the summer is much higher than the winter. Texas Water Matters July 2010 report compared the summer months (July, Aug, Sept) usage with winter months (Dec, Jan, Feb) from 18 major Texas cities and found an average increase of 58%. College Station had 93% more usage over the summer for this period!

Does this mean water conservation and planning at the local level is not relevant during the winter months? Of course not! What can the average person do during the winter months to help conserve water? Below we have listed a few items to keep mind and other actions we can do during the holidays and winter months!

Utility and water bill assessment

How much water are you using? Like energy bills, our bills are good records of our behavior and help us adjust our strategies. The following chart illustrates typical residential water usage by day in the United States. Outdoor use (primarily irrigation) is the dominant component, with the toilet, clothes washer and showers making up significant portions as well. Let us look at some of these in detail.

Mindful landscape management

Irrigation of landscapes and gardens are a significant residential water use in the warmer months but be aware that water needs of many plants drop dramatically in the fall and winter. Adjust your schedules and watering appropriately. Evapotranspiration is lower. Additionally, plant growth activity for many species is stunted. Cooler weather and seasonal rains may make it possible to minimize or even stop supplemental irrigation. Consult your landscape profession-

al or Texas A&M’s AgriLife Extension Service for more details about specific information about individual plants. By all means, avoid watering during any form of precipitation. Also, use organic mulch around winter plants especially around trees to trap moisture in the soil.

Upgrade and fix home infrastructure

Fix leaks and replace old faucets and showerheads. If the shower can fill a one-gallon bucket in less than 20 seconds, replace it with a water efficient showerhead. Install water efficient faucets throughout the house. There are numerous water-saving devices on the market. Look for aerators, flow regulators, and displacement devices. Replace old toilets with more efficient low flow toilets and save as much as five gallons per flush and flush only when necessary.

Modify domestic water use behavior

Clothes washers use a considerable amount of water in the average household. Purchase energy and water efficient clothes washers if able. Additionally, run full loads and be frugal about your consumption. This will also save a tremendous amount of energy in clothes drying. Don’t let water run continuously while brushing teeth, shaving or ‘warming-up’ the shower, or at least ‘warm up’ quickly!

Dishwasher water use

Watch your dishwashing habits during the holiday meal preparations and cleanup. Running a tap continuously while preparing food or washing dishes can use more than two gallons of water every minute. Scrape dirty dishes completely and dispose into the trash or compost. Minimize your use of the sink disposal. Use a fully loaded dishwasher or wash by hand. If you wash by hand be sure not to run the tap continuously. Start with a small amount of soapy water in the sink and apply water as necessary to minimize the amount of water usage. Dry in the dishwasher or by hand! It can be done and these simple practices could save 10 gallons of water per event.

Reduce your energy consumption

According to the National Renewable Energy Laboratory (2003) the loss of water due to evaporation in the production of power is approximately 2.0 gallons per Kwh consumed! How much energy does your dwelling use? According to the US Energy Information Administration (2010) the average Texan uses 1,262 Kwh per month. I’ll let you do the math!

Adapted from the USGS ‘Estimated Use of Water in the United States’ 2005.
Snowy Supplies
By Janet Torres

To some, the coming of winter is about much-needed vacation time with a holiday backdrop. Some travel south for the winter in hopes of relaxing in a sandy wonderland. Other adventurous Americans travel to the north to escape the rather tame central Texas “winter” in search of snow and ski boots. Aggieland seldom receives a frozen white present from the clouds during the wet winter season, but the rains are welcomed. Many Texas reservoirs depend on rain not only as water supply, but also to lower the use of irrigation; the amount that is collected and saved will play a huge part in determining the year’s water strategy.

There are some states that have a more interesting relationship with their winter water winnings. To winter people in the western United States, it’s not just about attracting tourists but also about packing snow. While some of you will enjoy sliding down a black diamond for the thrill that it offers, there will be a handful of people getting their kicks analyzing this wonderfully wet winter delight because, to them, it is a frozen water supply. The amount of snow packed during the winter will determine the water management strategy of the coming year.

The high mountain west depends on snowpack for 50 to 80 percent of the year’s water supply. The amount of water the snow will yield depends heavily on external variables like soil moisture conditions, fluctuations in temperatures, humidity and precipitation patterns and the density and type of snow determines how fast the water will be delivered. Fast delivery, a result of, say, a dry winter with low soil moisture and snowpack’s with low density, might cause flooding, while an early and rapid snow melt means less water can be stored for later use. If a snowpack is ideal, it will slowly release the frozen resource, allowing reservoirs to maintain a steadier level of storage and supply.

Agriculture is one of the heaviest hit in the arid West because taking advantage of long sunny days requires hefty irrigation. A recent study at Stanford university found that climate change could mean a reduction in snowpack levels around the world and as soon the next 30 years. The Northern Hemisphere would experience changes in water regimes that will require water managers to adapt quickly. The more than 10 states that depend on snow as a water supply in the U.S. include some agricultural heavy hitters like California, Colorado, Washington and Idaho, which could suffer major economic losses. In California alone, more than 25 million people and approximately 1 million acres of farmland depend on snowpack yields. The government sees the need as most states now have incorporated climate change strategies into their state water plans. However, few states have comprehensive plans and policy measures ready in case unexpected climate changes drastically affect their water supplies.

Water Woes: An International Perspective
By: Zuri Dale

According to the World Bank, the world cryosphere, or ice zone, is rapidly melting in non-industrialized parts of the world. More specifically the Chacaltaya glacier in Bolivia, since 1982, has lost 80 percent of its surface area. And over the past 35 years, Peruvian glaciers have decreased in mass by at least 1%! What does this reduction in the ice zone mean? Approximately 12% percent of the water that normally flows into the country’s coastal region, home to 60 percent of Peru’s population, is no longer in existence. If these trends are correct, it is estimated that in the next 20 years many of the glaciers in the Andes will completely disappear, thereby denying over 75 million residents that reside in the area access to clean water. Not only will water supply be reduced, but hydropower reduction is at risk which accounts for a major percentage of electricity generation in Ecuador, Bolivia and Peru.

While the World Bank releases highly detailed reports, it is highly likely that the Aymara Indians that reside in Bolivia, have never even read them, but it does not take much to gaze at the Andean ice caps and bear witness to that they are in fact rapidly diminishing. And those residing in the capital city of La Paz in Bolivia, need only glance at the mountain tops of the Illimani Mountains and witness the ice as it slowly fades away.
Similarly in a completely opposite part of the world, the Himalayas, since 1962, have lost 21% of their glaciers. And unfortunately Himalayan glaciers are the primary water supply for river systems whose flow irrigates much of China, India, and Pakistan’s agricultural crops as well as supplying a great portion of the region’s water supply.

What is the cause of this, we wonder? Well, it appears that the cause of this natural disaster is the excessive emission of greenhouse gases from industrialized countries such as the United States. While the carbon-footprint of underdeveloped countries such as Bolivia is so small, these poor are not only feeling the effects of climate change, but also lack resources to compensate.

In a world where we like to assume we are not culpable for climate change, there lies a country such as Bolivia that itself emits .02 percent of global greenhouse emissions, but has already suffered economic loss from climate change impact due to flooding in the Amazon. This winter season, as we sit around our warm fireplaces drinking homemade eggnog, this poses something to ponder... in a less developed part of the world, a country suffers from a rapidly diminishing water supply. How do we find solutions to nature's phenomena? And who therefore is responsible?

As we finished our finals this past semester, one thought was on many of our minds—the holiday break! If we were lucky, and our advisors were kind, we got to escape College Station for a few days. While many of us celebrate Christmas or Hanukkah during this time, we have quite a few international students that celebrate in a different way.

Shailee Jain is a first year master student in the WMHS program from Pune, India. On January 14th she and her family celebrate Makar Sankranti, which is a harvest festival observed throughout the country (although there are different names for it in each locality). On this day, kite flying competitions are held and homemade sweets of sesame and jaggery are enjoyed. What's jaggery, you ask? It's unrefined sugar made from crushed sugar cane stalks and comes in a spreadable texture or a solid cake-like form. Yum!

Afreen Virani is also a first year master student in the WMHS, and she is from Dubai, United Arab Emirates. On January 1st she celebrates New Year's, and for the entire month of January she likes to attend the “Dubai Shopping Festival”. Think Black Friday, but for an entire month! Around 35 million people have visited Dubai for this festival, complete with fireworks and parades every night. Afreen recommends visiting the Global Village in Dubai, where over 39 pavilions each host a different country and one can enjoy cultural cuisine, shopping, and performances.

You are an amazing bunch! You are incredibly intelligent, gifted and talented. You come from all sorts of educational backgrounds, from geology and biology to mathematics and entomology, and many many more. You come from all parts of the globe, not just the United States. You are some of the brightest and most intelligent people I have ever met. You are wise beyond your early years and will soar to great heights in your academic and professional lives. You have enriched my life in so many ways; I am a better person because of you.

I know that many of you are facing tremendous hurdles in the immediate future, and many of you will face such hurdles later in life. I hope that you will be able to see beyond these hurdles and realize that they are just minor “speed-bumps.” Unfortunately, there are many such hurdles in life. But you all have the strength and fortitude to overcome such hurdles and get passed these “speed-bumps.” Never give up on your dreams! There is always a way around these “speed-bumps” of life!
You are my classmates, my academic colleagues, and mostly, my friends. I am privileged, and so honored to be accepted by you, my friends. Thank you.

Now, go out there and conquer the world! Never accept negativism and never give up on your dreams! Happy Holidays to all.

Cold Water Words
Crossword Puzzle by Min-cheng Tu

ACROSS

2) Areas of ice-free water in the Arctic ice pack that stay clear for up to 9 or 10 months of the year
4) Swimming pool-sized breathing holes in the solid sea ice
9) A condition in which snow and clouds change the way light is reflected so that only very dark objects can be seen
11) A long pointed stick of ice that is formed when drops of water freeze
12) Similar to rainbows, but have little color because of the very small size of the water droplets
13) A large area of ice floating in the sea
15) A sudden light fall of snow, blown in different directions by the wind
16) Open lanes of water created by movement caused by currents pulling sections of the ice cap apart
17) The largest island in the world which is located primarily within the Arctic Circle
21) A snowhouse that was used by the Inuit as a temporary shelter
25) Inuit word for "blizzard"
27) An area of land which is permanently frozen, whose surface melts in the summer and freezes again in the autumn
28) A small hard mound or bump on a ski slope
29) Very small chunks of floating ice that rise only about 1 meter / 3 feet out of the water
30) Small hard balls of ice which fall from the sky like rain
31) Snow that is lying on the ground and has started to melt
32) A glacier loses material in the water
33) Massive piece of sea ice composed of hummocks that has separated from the ice pack
34) Change from a solid, frozen state to a liquid or soft one, because of an increase in temperature
36) The Russian nuclear-powered icebreaker which was the first surface vessel to reach the North Pole
37) When schools close due to a forecast of snow, but no snow falls

DOWN

1) A pile of snow or something similar, formed by the wind
2) Unable to travel because of heavy snow, or (of roads) not able to be travelled on or reached because of heavy snow
4) A short period of rain or snow
5) Ice the consistency of thick honey that is in an early stage of freezing and has not yet become solid
6) Inuit word for "drinkable snow"
7) Non-alcoholic part of cocktail "Christmas Tree Water"
8) A very large mass of ice that floats in the sea
10) Situation when a ship finds itself forcibly pressed on both sides by ice
14) Wet, partly melted falling snow
18) A large amount of ice, snow and rock falling quickly down the side of a mountain
19) Very cold, with a thin layer of white ice covering everything
20) Fallen snow that is loose and dry and has not begun to melt
22) A small piece of snow
23) A "splashing sound"
24) Water which falls from the clouds towards the ground, especially as rain or snow
26) A very light fall of rain or snow which lasts only a short time
31) What the residents of Dakota call a mix of snow and dirt blown of the prairies
32) A very deep crack in the thick ice of a glacier
35) Liquor used in the cocktail named "Christmas Tree Water"