



HIGHLAND LAKES CHAPTER



Highland Lakes Steward

Sherry Bixler

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MISSION

The Texas Master Naturalist program is a natural resource-based volunteer training and development program sponsored statewide by Texas AgriLife Extension and the Texas Parks and Wildlife Department.

The mission of the program is to develop a corps of well-informed volunteers who provide education, outreach, and service dedicated to the beneficial management of natural resources and natural areas within their communities for the state of Texas

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RUFOUS HUMMINGBIRD (SELASPHORUS RUFUS)

Sherry Bixler

The brightest of North American hummingbirds is easily the Rufous Hummingbird. It is a special treat to see one in the hill country where the Ruby-throated and Black-chinned are the usual species. Four Rufous Hummingbirds were reported at Inks Lake in early February; they are the most likely of the 'western' hummingbirds to show up at feeders in the eastern states. They are early migrants and are usually seen in very early spring or late summer in Texas.

Only three and a half inches long, they belie their small size with very aggressive behavior around favored feeding spots and nesting spots. Some have called the Rufous Hummingbirds pugnacious, since they not only drive away other hummingbirds but also larger intruders and predators such as squirrels and blackbirds. Those who put out feeders for the hummingbirds sometimes hang a second feeder a bit higher or away from the first one, making it more difficult for the Rufous to chase away all the other hummingbirds.

The male Rufous has a brilliant orange-red throat, orange belly and orange undertail but has green on his wings and sometimes on his back and crown. The female has a small spot of orange-red on her throat that distinguishes her from other females usually found in this area. (Anna's and Allen's females have a similar spot but are extremely rare here.)

The Rufous Hummingbird breeds further north than any other hummingbird. (Hummingbirds are a Western hemisphere species and there are eighteen species in



By Jeff Larson for The Cornell Lab of Ornithology

the United States but several hundred in Central and South America.) One couple we met in Panama moved there from the states just to be able to see the numerous species that visit their home.

Rufous Hummingbirds have a built-in GPS that allows them to establish and remember a path to their favorite flowers and feeders, which they visit at least once a day. They also return to favorite spots from one year to the next.

The nest is very small and cup-shaped and consists of lichens, moss, plant down, leaves, shredded bark and plant fibers, all bound with spider silk. Nests are often reused or re-built. There are generally two eggs but occasionally one or three. Nests are sometimes clustered in a semi-colonial area although most are solitary. A few birds raise two broods if food supplies are good. Eggs hatch in about two weeks and the birds fledge in three more weeks.

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THE STATE OF THE PLANET AT SEVEN BILLION: SOME STATISTICS FROM NATIONAL GEOGRAPHIC MAGAZINE

by Ray Buchanan

In April of 2011 (NEXT MONTH!!!) the planet Earth will achieve a population of seven billion human beings!! The statistics about this huge mass of people, as reported in the March 2011 issue of the National Geographic Magazine, are rather positive. 82% are literate; 51% live in urban environments rather than rural (less energy is consumed per capita in urban areas than in rural); more children live to adulthood and fewer adults die of preventable diseases; the percentage of human beings with a decent standard of living is

higher than ever before; and the birth rate is falling.

Yet, it takes 38 percent of the earth's ice-free surface to feed these seven billion people (and the population is expected to hit 9 billion by 2050). Two percent of the population own 50 percent of the wealth of the globe. Average years of education among the one billion with the highest average income (\$12,196 or more) are 14.5. Number of cars (a leading source of harmful emissions) per 1000 for that group of one billion is 435.1.

Calculating the most typical human being on the globe, one comes up with a 28 year old Han Chinese male: the most populous ethnic group (1.3 billion people) in the most populous country, China. But by 2030 the most typical human face will be Indian. There are 1.01 males on the globe for every one female. 40% of the globe is employed in services, 38% in agriculture, and 22% in industry. In terms of languages: 13% speak Mandarin, 5% Spanish, and 5% English. The challenge, according to National Geographic, is "how to share and sustain the planet while lifting even more people into a better life." And with Leopold we Master Naturalists must ask: what will happen to the "natural, the wild, and the free?"

MARCH/APRIL MEETINGS

We had a great presentation from Lisa Benton on Water Quality in the Hill Country at our March Meeting. Lisa was presented with a watercolor of a hummingbird by Daniel Adams in appreciation. The watercolor was donated by Sherry Bixler.



★ **The next chapter meeting will be Wednesday, April 6, from 2:00pm until 3:00pm at the Kingsland Library. It will be a business meeting only, no speaker. We have a conflict that day with the Great Outdoors Project at Inks Lake State Park, where many of our members volunteer. In May, we return to a regular meeting schedule.**

TEXAS MASTER NATURALISTS HIGHLAND LAKES CHAPTER



Texas Master Naturalists are a group of well-informed, trained and certified volunteers with a mission to help improve public understanding of our natural resources and ecology. We're sponsored by TPWD and the Texas A&M Agrilife service. We provided over 10,000 hours of volunteer service to our three county area of Burnet, Llano and Blanco counties in 2010 and we train 20 new members/yr.



T E X A S

Master
Naturalist



ttxmn.org/highland_lakes



AgriLIFE EXTENSION
Texas A&M System

LMAP

LAND MANAGEMENT ASSISTANCE PROGRAM

Free to Landowners in Burnet, Blanco, and Llano counties. We will visit your land upon request to help you identify and offer suggestions regarding:

- Plant Identification
- Erosion
- Indication of Oak Wilt
- Riparian Care
- Invasive Plants
- Wildlife Conservation
- Land Trust Referrals
- Cowbird Control
- Wildlife Tax Evaluation
- Feral Hogs
- Deer Control
- Ashe Juniper Control
- Rainwater Collection
- Other Nature Subjects



For a free Land Management Assistance visit, call 512-756-5463 and ask for LMAP. Your request will be forwarded and a Master Naturalist will contact you by phone or email.

Since everyone didn't get a chance to see the LMAP rack card that went out to some veterinarians and feed stores in our three county area, I have included a copy of it for your perusal. We have already started to get some attention from it.

Billy Hutson

EXPLORING RIPARIAN MYTHS: #2 DROUGHTS ARE BAD

Sammye Childers



Toledo Bend Reservoir, along Highway 6, October 4, 2006.
Photo courtesy of Wiley Butler, Coop-Observer, Natchitoches, Louisiana

No one can dispute the damaging consequences of a severe drought. And, none can prepare for such an event. That being said, drought is a normal and recurring part of our climate and ecology.

Droughts may actually benefit a well vegetated or recovering riparian zone. The root systems of riparian vegetation are usually connected to an unseen water table and as the water levels drop due to drought, the plants follow the receding water by deepening their root systems. To stay in contact with the shrinking ground water, the plants will concentrate their available energy into newer, deeper root growth. The new roots grow laterally under the stream channel to provide a denser and stronger “root basket” under the channel to reinforce and stabilize it. The more roots present in a riparian zone the more resistance it will have to erosion and flood damage.

Low water levels expose lake sediments to drying

and oxidation. This helps firm the bottom, improving it as a spawning ground. In addition, nutrients will be released into the lake water and the grasses and plants that grow on the exposed lake bottom will provide nursery habitat when the lake is re-flooded.

Another response of drought in riparian areas is the collection of plant remains and large wood on the banks, in the flood plain and in the channels. This debris and the sediment it traps will aid in the infiltration of water into the ground, in controlling run off and in increasing the storage capacity of the “riparian sponge”.

During prolonged dry periods riparian areas also benefit from the absence of scouring flood waters which can uproot newly establishing vegetation. This temporary reprieve from floods and scouring allows new plants to establish stable root systems.

Reviewed by Steve Nelle, NRCS biologist

UNINTENDED CONSEQUENCES (AGAIN)

Mike Harris

Question?

Why did Myxomatosis, a virus first discovered in imported rabbits in Uruguay in 1896 make the Large Blue Butterfly (*Maculina arion*) extinct in the UK 1979.

Answer:

Uncut grass

The Large Blue lays its egg on only one food plant, the wild thyme - *Thymus drucei*. This plant is a common and widespread coloniser of bare ground, usually chalk/limestone and rarely reaches a height of over three inches. The eggs hatch and the grubs feed on the flowers for a few days but gain little weight. In August, the caterpillar will wander a short distance from the plant and try to entice a red ant to adopt it and carry it to its nest. The caterpillar does this by producing 'honeydew' sugar for the ant and by using other tactile and olfactory signals to the ant. The 'tricked' ant carries the caterpillar back to its nest, whereby the caterpillar then feeds on the ant eggs and grubs. The caterpillar will then go into hibernation in the nest over winter. For up to three weeks after hibernation the caterpillar will gorge on the larvae and eggs and then hang on the nest's roof by its legs and build a chrysalis around itself. Metamorphosis will take another three weeks transforming the half inch long caterpillar into the Large Blue adult butterfly. It will then leave the nest to find a mate. Usually the red ants will escort the butterfly to the surface and ward off any attacker whilst the butterfly's wings dry out. When the butterfly is ready to fly the ants return to their nest.

There are number of factors that are required for all of this to happen. The most important is that the right species of ant must be present in the area. Should the turf increase in height by as little as inch (2cm), the microclimate is cooled sufficiently for a second ant species (*Myrmica scabrinodes*) to enter the area and displace the *M.sabuleti*. This change in ant species reduces the caterpillar survival from roughly 15% in *M sabuleti* nests to 2% in *M scabroinodes* nests.

Other factors that affect the caterpillar survival are:

- the ants must be well fed. The deceptive signals may not be sufficient to prevent it from being



© National Trust / Matthew Oates

eaten

- the ant colony must be within 6ft of the thyme plant, which is the ants foraging distance
- there must be at least 400 worker ants in the colony to provide the roughly 230 ant larvae needed to sustain the caterpillar
- most importantly, there should be no queen in the colony, as the caterpillar survival rate increases by a factor of three when the queen is absent. If a queen is already present, the nurse ants will attack and kill other queen larvae, which they detect by smell. The caterpillar will get covered with pheromones from the queen larvae while feeding, which will result from in it being attacked by the nurse ants. This 'queen effect' is weakest – the butterfly survival rate the highest – when the ant colony is newly established or has been increasing for only 3-4 years.

As stated above this butterfly exists only by virtue of the wild thyme -*Thymus drucei* and the ant - *M.sabuleti*. The thyme and the ant only exists because of the short grass. The grass was kept short by the rabbit. Myxomatosis was introduced into Australia in 1950 and then into Europe in 1952 to try to decimate the rabbit population and so improve food crop out-

put. In Australia at the introduction of Myxomatosis, the rabbit population fell from an estimated 6 million to 1 million in less than two years, such was the potency of the virus. In the UK, just after WWII, trials were set up in the outer isles of Scotland but failed. The reason for the failure was due to the carriers of the Myxoma virus not being present. The carriers are the blood feeding insects fleas, mosquitoes and the Cheyletiella fur mite. When huge numbers of rabbits were killed in the UK, the grass grew longer and this made the butterfly extinct.

It is so easy to destroy. So much more difficult to understand the repercussions and to provide a solution.

Note: Naomi E Pierce, Harvard University, who has had many documents published about the lycaenid (Blues/Coppers/Hairstreaks/Harvesters) larva and ants stated in a publication in 2002 " that over 75% of lycaenid larva , with known life histories, associate with ants. Such myrmecophilous (*an animal that lives in a colony of ants*) relationships maybe mutualistic to varying degrees or even parasitic".

Rufous (Continued from page 1)

Hummingbirds will investigate almost any red object and seem to prefer red or orange blossoms. Most nest in the northwest and along the Canadian Pacific and often feed on the red-flowered currant that is native to the area.

When hummingbird feeders are used, care must be taken to change the nectar frequently, especially in hot summer months.

GREAT BACKYARD BIRD COUNT, FEB 18-21, 2011

Sue Kersey

The Great Backyard Bird Count reports show that we did indeed have great birds in the Highland lakes area to count. And I do hope that many of you joined in to count & record online your results.

Mike and I had 36 species that showed up to be counted and several in really large numbers. We have our numbers on the GBBC website and the number of birds we have counted are 478 in 2008, 292 in 2009, 568 in 2010 and 518 in 2011. Some years had weather issues and this year we had a very

grey day and poor conditions again.

The local towns showed an increase in number of species and checklist listed below:

Locality	# of Species	# of checklist
Blanco	48	15
Marble Falls	60	18
Kingsland	44	11
Johnson City	31	8
Llano	44	8
Lago Vista	24	6
Bertram	25	25
Buchanan Dam	89	5
Lampasas	36	5
Burnet	14	2

I would love to see the number of checklist really go up next year as more of you enjoy counting and recording this exciting bird count.

The most reported species on all checklists was the Northern Cardinal followed by the Morning Dove, Dark-eyed Junco, Downy Woodpecker, American Goldfinch, Blue Jay, American Crow, Black-capped Chickadee, House Finch, and Tufted Titmouse.

Our 2011 numbers were really good for Texas too. Texas is ranked 6th in states submitting the most checklist. Texas was number 1 in reporting the most species of 326. We are number 3 in reporting the most birds with 487,539. And of the top ten localities reporting the most species Corpus Christi was number 1 with 193 reported species, Rockport was number 2 with 172 reported, Kingsville was number 6 with 139 and San Antonio ranked number 7 with 132 species.

All of the results from all of years 1998-2011 can be found by going to the website <http://gbbc.birdsource.org>. If you want to see your personal GBBC results go to www.birdcount.org, explore the data (top link)/view detailed reports/then go to 'my observations', and then type in the email address you used for your count. All of the numbers above could change as checklists can still be added to the site for the GBBC.

Thank you so much to all of you that took the time and reported your Great Backyard Bird Count results.

COTTON RATS (SIGMODON HIPIDUS)

Phil Wyde

Highland Lakes Master Naturalists, look at the animal in the picture below. It is very common to this area. Do you know its name or anything about its life? Does it look like an ordinary rat? Well in fact, the animal shown is a hispid cotton rat (*Sigmodon hispidus*), and she is not ordinary.

Before telling you what makes the cotton rat extraordinary, I would like to tell you how the species gets its common name. After all, looking at one (see picture), there isn't much that would bring to mind cotton. (Although their fur looks soft in the picture, it is actually quite coarse.) Well it so happens that when cotton is available,



Cotton rat

from www.texasbeyondhistory.net

this animal will often use it to line its nest. Needless to say, this habit, and the fact that cotton rats often eat parts of the cotton plant, does not endear them to cotton farmers. In fact, hispid cotton rats are not loved by many other types of farmers. Although the creatures are omnivorous and occasionally eat insects and other small animals, they prefer to eat stems, leaves and seeds of both domesticated and wild plants. Thus cotton rats can cause damage and greatly reduce crop production of a number of different crops besides cotton, including melons, rice, alfalfa, grains, fruits, vegetables, peanuts, sugarcane, corn and sweet potatoes. We can add hunters to the list of people that do not like cotton rats since these rodents eat the eggs of quail and other ground nesting birds.

The hispid cotton rat can be found in much of the southern and western United States, in Peru, Ecuador, Columbia, Venezuela, the Guyanas, Brasil and throughout Central America. They are abundant in Texas and have been recorded in Llano and Blanco Counties. They have not been recorded in Burnet or Lampasas Counties. However, based on the large number of cotton rats that I have seen on my property in Llano County, I would bet your life that they are in Burnet and Lampasas Counties also.

Cotton rats are not "true" rats (i.e., they do not belong to the genus, *Rattus*). However, they do belong to the order, *rodentia* and family, *muridae*. Thus,

they are related to true rats and mice. They usually have at least two litters per year and can have as many as nine annually. Litter sizes range from 1 to 15. A nest is built by the female either on the ground surface or in a borrow. Gestation usually lasts approximately 27 days. The neonates are born mobile and with fur. Their eyes usually open 18 to 36 hours after birth. This is in marked contrast to most rodents which usually are born naked and blind, and do not get fur or open their eyes for at least two weeks. Baby cotton rats generally are weaned 10 to 15 days after birth and reach minimum adult size by about day 41. Females are often sexually mature by day 40 and they can mate within 24 hour of giving birth. **THESE FIGURES INDICATE THAT COTTON RATS ARE AMONG THE MOST PROLIFIC MAMMALS EXTANT!** Indeed, based on the numbers just presented, if all of the progeny for just 3 generations survived, the number of offspring from the original female could exceed **THREE MILLION!**

Clearly all cotton rat progeny do not survive. They are near the bottom of the food chain and are the prey of many predators including hawks, owls, snakes and other mammals (e.g., coyotes, bobcats, weasels, raccoons). In addition, as the density of the rats increases, the animals become more and more crowded, overgrow their food sources and become very susceptible to disease. Indeed, although cotton

rats can live up to 5 years in captivity, they seldom live longer than 6 months in the wild. You can easily see that if they did not develop and mature very quickly (to my knowledge guinea pigs are the only rodent species that develops faster than cotton rats; guinea pigs are born fully developed with their eyes open), they would have become extinct long ago. Regardless, it is clear that cotton rats are an important food source for a number of species.

I would now like to share with you a very interesting tidbit. If you grab a cotton rat by its tail, ITS TAIL SHEATH WILL COME OFF! You are probably thinking what is so special about that? Well if you are a hawk or a bobcat and you grab a cotton rat only by its tail, it is likely that you will go hungry. The removable tail sheath is a survival mechanism. They have some other survival traits. They are very fast and can jump vertically a foot or two with little apparent effort.

So far, as pertains to cotton rats, the negatives would seem to far outweigh the positives. In fact, I can add another negative. The cotton rat can harbor hantavirus, a serious human pathogen. However, what most of you probably do not know is that for more than 50 years, the hispid cotton rat has been used as a model to study an extensive list of important human pathogens including polio virus, scrub typhus, human adenovirus (hAV), human respiratory syncytial virus (hRSV), human parainfluenza virus type 3 (hPIV3), human measles virus (hMV) and human metapneumovirus (hMPV). This is quite unusual, since except for some monkey species, very few animal species can support the growth of so many human pathogens. Regardless, the cotton rat has become a major model for studying these serious human pathogens, and for developing agents to ameliorate or prevent the diseases caused by these pathogens. I will use hRSV as an example. This virus can cause death in infants and is one of the leading causes of chronic lung disease in humans. Virtually all children will experi-

ence an RSV infection before the age of two. All of the primary, licensed treatments currently used to treat RSV were developed and approved following testing in hispid cotton rats. No vaccines are currently available to prevent hRSV infections. However, potential hRSV vaccines are currently being tested in these animals.

Cotton rats have also been utilized as the primary animal model to test the use of human gene therapy using adenovirus vectors to deliver replacement genes. It is hoped that this type of gene therapy will someday be used to successfully treat many human diseases, including cystic fibrosis (CF). (CF is caused by one or more defective genes which causes the body to produce abnormally thick mucus. This mucus builds up in the lungs, breathing passages and elsewhere causing a debilitating and lethal disease.) If the gene therapy studies performed in cotton rats bear fruition, it may be possible some day to inject CF patients with rAV carrying segments of hDNA that code for normal mucus production, leading to replacement of the defective mucus producing gene(s) in these patients and ultimately to their recovery.

At this point you probably know a lot more about cotton rats than you did before reading this article. You now know that this species lives right here in the Texas Hill Country and is not just an ordinary rat. I hope that you now agree with my assessment that the species is not ordinary. Although not as pretty as a painted bunting or a Texas blue bonnet, cotton rats play an important role in some of our lives. Hopefully while reading about cotton rats, you have thought about niches, food chains, the mixed roles of a species (negative and positive), survival traits and the use of animals to study the pathogenic mechanisms of different disease causing organisms, as well as the safety and protective efficacy of different biologics to treat these diseases.

Stewardship

An ethic that embodies cooperative planning and management of environmental resources with organizations, communities and others to actively engage in the prevention of loss of habitat and facilitate its recovery in the interest of long-term sustainability

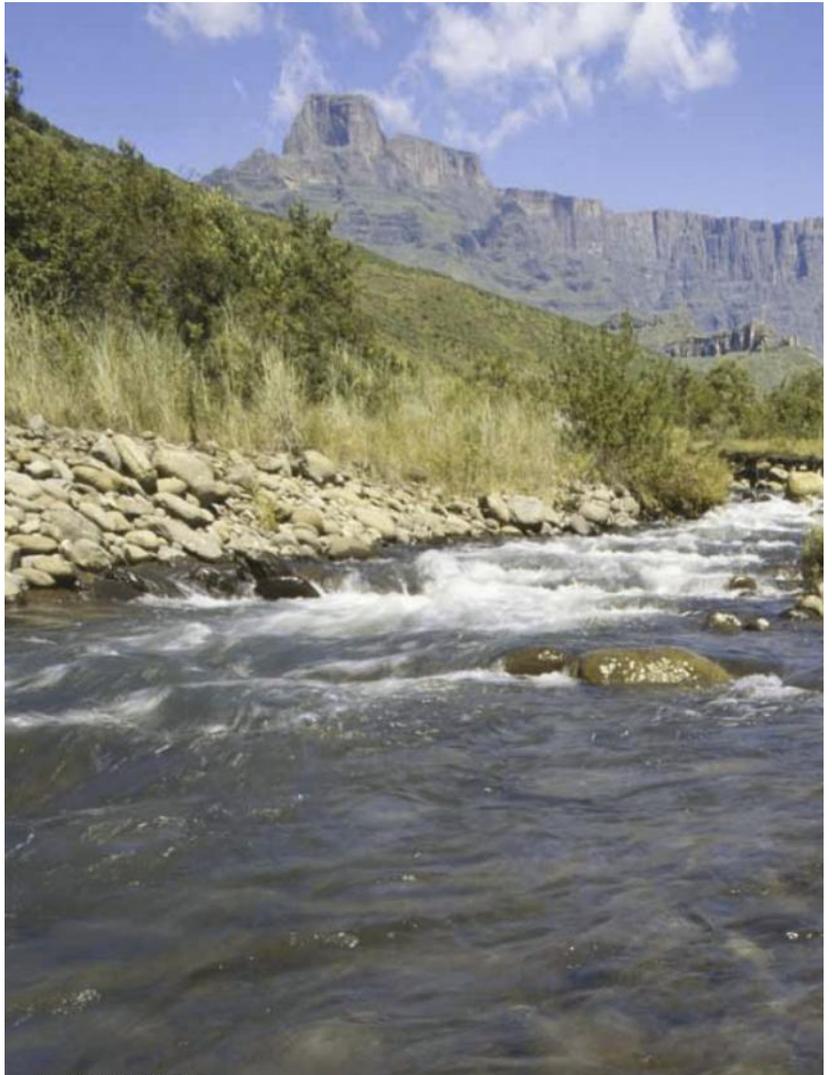
INTERNATIONAL CORPORATION ASSUMES RESPONSIBILITY FOR WATER CONSERVATION

Ray Buchanan

What is wrong with this scenario?: (1) buy supplies on global market, coordinating cost factors with high quality; (2) use those resources to manufacture reliable product at high efficiency level; (3) sell at reasonable prices in receptive markets; (4) earn sustainable profits; (5) provide shareholders with generous dividends; and (6) take pleasure in attractive stock prices. Why, of course, there is nothing wrong here! It all smells of success!

So, then, what about this scenario?: (1) spend managerial time and considerable funds trying to persuade suppliers to change their production practices; (2) investigate a policy at every production facility to produce more product while constantly limiting the most significant input; (3) initiate expensive and time-consuming studies of resource utilization within the entire company as well as within all the local geographic areas where the company operates; (4) sell at reasonable prices in receptive markets; (5) earn sustainable profits; (6) now, forego generous dividends; (7) now, risk negative stock market results. Well, if you say this second scenario seems headed in a convoluted manner toward some kind of disaster, you would not be far off the mark. And if you take another step and claim that CEO's probably have in mind that second, risky (and even foolish) scenario whenever anyone mentions "green" or "conservation", you would be correct again. "Environmentally responsible" seems to contradict the traditional and "necessary" focus on bottom-line profits – a bad dream made even more poignant by the specter of more government regulations.

But such thinking about this second scenario does not bother SAB Miller plc, an international corporation headquartered in London with about 100 production facilities spread over six continents. For Miller, profit as a corporate priority along with a massive company funded conservation program is complementary, not contradictory. For, you see, Miller is a brewing company and ensuring a sustainable future for



Tugela River headwaters, South Africa

water, which constitutes 90% of every litre of beer sold, has become a dominant motivating factor in the company's business decisions. And a positive approach to water conservation has led the company into assuming a proprietary position in the local community and/or in the regional watershed.

How did this happen? Unlike Miller, most corporations must incur huge expenses in order to embrace (or be forced into) conservation measures: i.e., add expensive scrubbers to clean up emissions polluting the air; completely alter the product gathering processes that destroy whole mountain tops and nearby streams; or employ expensive reagents to handle

toxic waste by-products from the manufacturing process. Rather, Miller's environmental concerns center on the availability of a clean and reliable supply of a natural resource on which every other business and every rural and urban community and the ecological system depends. What is good for Miller's most significant industrial input – water – is also good for the local forests, for agriculture, for the municipal water system, and for the far-reaching watershed/river basin system: “water is a fundamental shared resource” (p. 04) So, the method by which Miller came to investigate its own dependency on water and to explore the broader issues of water conservation led inevitably to the company accepting responsibility for promoting local action among shared stakeholders.

The 2010 report, “Water Futures: Working Together for a Secure Water Future” (sabmiller.com/files/reports/water_future_report.pdf) details this methodology and the broad-based commitment by Miller. First, Miller created a Partnership with the World Wildlife Fund (UK) and with GTZ (*Deutsche Gesellschaft für Technische Zusammenarbeit*, a branch of the German Federal Ministry for Economic Cooperation and Development) – both, organizations with high-level expertise in water management issues. Then, utilizing these technical skills, Miller instituted quantitative studies of the water footprint (amount of water used) for every part of its value chain (beginning with crop production – barley and hops – and ending with the distribution of the final products to wholesale and retail outlets) for its entire operations in Peru (5 breweries and 2 bottling plants – mostly for Coca Cola); in Tanzania (4 breweries); in Ukraine (1 brewery); and in South Africa (7 breweries and 6 bottling plants).

These water footprint studies showed a considerable amount of variation between countries: the Peru operation uses 61 litres of water per litre of beer produced, whereas in Tanzania it took 180 litres of water to produce a litre of beer. This finding reinforced the important impact of local factors on water consumed in Miller's value chain throughout the globe. But all four examples highlighted the fact that the vast majority of water used throughout the whole value chain was in the cultivation of raw crops – over 90% in all cases. The company realized that the role

of agricultural practices in a region has a “far greater impact than previously thought” (p.01) And because this part of the production process was not directly under the control of Miller, “it [became] the most challenging to address” (p.01). Faced with this situation, Miller could not continue building a “secure water future” without venturing outside the company to work closely with local suppliers “to promote better



A brewery worker packs crates of Cristal, Peru's leading beer brand produced by Backus; SA BMiller's brewing operation in Peru. One Red Eye/Jason Alden.

farming practices, including water stewardship”(p. 01).

And, furthermore, the studies identified risk factors inherent at the level of an entire watershed or river system for each country. This justified for Miller looking “beyond the boundaries of its own operations” to engage local stakeholders (NGOs, government representatives, local businesses, and others) in discussions aimed at developing “detailed watershed protection programmes (sic) based on the assessment of the risks identified through [its studies]” (p.01). So, this vast water conservation program envisioned and initiated by Miller has pushed this international giant into a kind of “social engineering” position in the countries where it operates.

The reported results of its water footprint studies in Peru (see map included) clearly illustrates that the company is willing to take on that role: “to prove the business case for private sector engagement in promoting the sustainable management of water resources” (p. 02). Realizing that each country faces different water-related issues, is at a different level of economic development, uses land in different ways,

Peru

KEY BEER BRANDS

 **Cristal**
Cusqueña
Pilsen Callao

 **955**
BEER

 **32**
CARBONATED
SOFT DRINKS

 **71**
BOTTLED WATER

KEY FACTS

 **5**

BREWERIES

 **2**

BOTTLING
PLANTS

 **37**

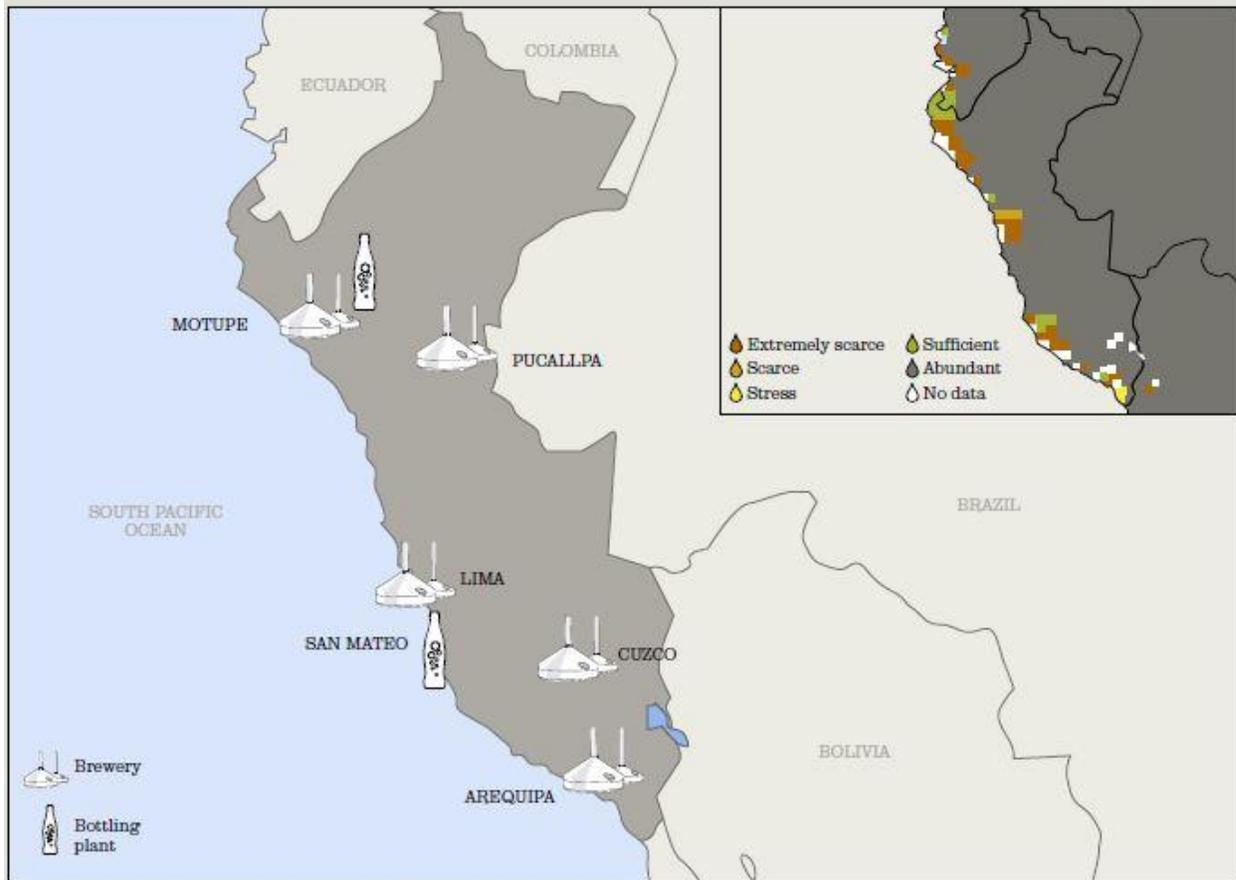
BEER CONSUMPTION
PER CAPITA (LITRES)

 **1,080**

TOTAL SIZE OF BEER MARKET
(MILLION LITRES)

FIGURE 5: GEOGRAPHIC OVERVIEW OF OPERATIONS

INSET MAP: ANNUAL RENEWABLE WATER SUPPLY PER PERSON (PROJECTION FOR 2025)



and experiences different climatic changes, Miller has sought to tailor its policy to specific local conditions.

The water footprint for Miller in Peru indicated a 90% use of water in cultivation and imports, 1% use in crop processing, 9% use in brewing and bottling, and 0% use in waste disposal. Internally, the Peru operations were found to consume 4.3 litres of water per litre of beer, which is a 7% improvement since 2008, in accordance with efficiency objectives. Externally, however, World Resources Institute reports show the availability of renewable water resources in Peru to be highly variable. Miller's studies indicate that two of its operations were located near a forest region labeled as "abundant". But a wider view indicated that water for the coastal facilities and for the largest cities came from glaciers threatened by temperature increases from climate change. Also, sugar and maize crops essential to local production were mostly located in the dryer coastal regions of Peru, which indicates a potential shift to more expensive import crop sources. Also, population increases as well as pollution of irrigation channels and surface water bodies from agrochemicals threatens to increase the cost of water treatment in the future.

So, in February of 2010 Miller and its partners held a broad-based stakeholders workshop in Lima which

discussed water resource conditions in Peru. The most significant conclusion was that the biggest threat to water in the country was pollution from agrochemicals. Also, risks in the dryer coastal areas where Miller operated and where major urban development and other businesses were located gained renewed attention. Thus, major support was given at the workshop for Miller to conduct more detailed watershed mapping operations in these areas with a view to identifying water availability from snowmelt, rainfall, and water contained within aquifers. The studies would also indicate how water supplies were being used by industry, agriculture, as well as power and water companies and suggest remedial actions.

Working for a secure water future has brought SABMiller to the position of managing internal water use efficiencies and of activating conservation policies outside the company for the good of the wider community. Its unique corporate conservation goal is: "we hope to influence thinking where we can and engage with policy and decision makers at a senior level and create the right arguments, incentives and awareness around critical water issues to improve the management for all" (p.36) Profits and conservation can go hand-in-hand!



The full report with the referenced pages can be found at:
http://www.sabmiller.com/files/reports/water_future_report.pdf

DENNEY RANCH 2 SPOTLIGHT

Deborah Douglas, M.D.
Photos by Thomas Fisher, M.D



(c) Thomas D. Fisher, M.D. 2011

Composite of a Southern Blackhaw tree in the creek bottom at Denney Ranch 2. The photographs of the bud (center) and characteristic bark (right) were taken March 5, 2011, while the photograph of the 5-inch flower (left) was taken April 2010



Evidence of a Great Blue Heron's recent visit to the pond at Denney Ranch 2

NEWS FROM INKS LAKE STATE PARK

Carol Navarro Adams

Hello Everyone, Got coffee? You might need one to swallow all of this.

Many thanks and much gratitude for the Master Naturalists who volunteered for the Clean Sweep at Inks Lake February 23. It was PERFECT! Together we



Instruction from Carol for Clean Sweep Day!

got so much done thanks to; Lyn Davis, Linda Fleming, Sherry Bixler, Judy Parker, Jared Maxwell, Helen Smith, Phil Wyde, Dennis Ellison, Nancy Ellison, Mike Childers, Kay Zander, Billie Gunter, Sammye Childers, Betty Cruikshank, Fredi Franki, Jerry Stacy, Beth Wesley, Art Schrider, Cathy Hill, Sharon Drake, Duke Dillion, Helen Dillon, Ed and Sue Lilley, Jeff Stokes, Debbie Gallagher, Wade Hibler, Elaine Barnhill, Cindi Fronk.



Trails needed cleaning too!

Following is a recipe for a PERFECT CLEAN SWEEP in the park:

Add, mix together and then divide up into groups;

- Many Energetic Vivacious Ambitious Master Naturalists
- Dynamic Duo Hosts with the Most Elaine and Roger Barnhill
- Fantastic Friends Group Frank Roasters Craig and Lynn
- Chris Nelson's Lovely Landing and Cool Beans
- Awestruck Park Staff of Naturalists and Rangers
- Perfect size projects in paradise
- Bake together for three hours in weather that's not too hot and not too cold.
- Afterwards enjoy 100 hotdogs and fixings' with coffee and good company and sweet setting.

And YOU have a perfect clean sweep in the park!



An opportunity and pick up LOTS of trash!



Can't beat a lunch of dawgs at Chris's Landing after a morning of hard work.

Wow! in my 10 years in this field this was the most wonderful clean sweep I have ever experienced. It was fun, it was fast, and it was delightful. I hope that you feel the same way. We are still talking about it and the impressive amount of work that was done by all of you. We are grateful for YOU, your time, energy, and green sweat that made our little corner of the Earth that we call Paradise even better. With all our hearts, thank you so much!

Many of you have asked: "What's next?" So here are some upcoming service opportunities that promise to be as much fun and rewarding.

Great Outdoor Program: Your own Master Naturalist, Terry Bartoli, will again be taking the lead at organizing the Great Outdoor environmental education program for the area's first graders. We plan to have 5 stations again this year, the aquatic station, eco-games station, birding station, furs and skulls station, and the Native American story station. Terry will be contacting you shortly with the specifics, but if you would like give him a call with your questions and interest. We have added an additional day this year because of the addition of a new school. It is rigorous, but very rewarding, seven days of fun in the sun (hopefully) with attentive, lively and delightful first graders. You can support the program all seven days, or as many as you can afford. The day starts at 9:00am and goes until Noon. If you just want to observe to see where you might fit in that's fine too. Just communicate your interest to Terry 325-248-3605. Here are the dates: April 5, 6 and 7, April 12, 13, 14 and 15. It's also a perfect time to see the bluebonnets blooming in the park.

Gardens Galore: Have you ever noticed the little garden by the Inks Lake park headquarters? It is in

need of some tender-loving care. We can supply the mulch, granite gravel and tools; however we need some green sweat and gardening/landscaping expertise to get that looking as beautiful as it can be. A little trim here and weeding there and it can be transformed from shabby to lovely. Beauty brings healing to the soul. Many a work weary people come here to find beauty and rest. Would you be interested in making this first

stop in the park a patch of beauty for our visitors? If so please email or call me.

Carol.navarro@tpwd.state.tx.us 512-793-4689.

In the future, once approval is granted from the powers that be, we will be putting in a butterfly garden around the park store. If you are interested in helping with this project please let me know.

Hummingbird feeder watch: You heard it from Mark Klym, its great fun and worthwhile to survey the hummingbirds we have in Hill Country. If you are interested in doing a hummingbird feeder watch at the park store back porch we have the feeders up and waiting for our little feathered jewels. Once they arrive, especially during migration in April it would be good to know who is visiting the multiple feeders.

Kayaking and Canoeing Kids Days in the Park; We are the place where young people experience their first time in a kayak and canoe. We offer these opportunities at no cost to the park visitors. Would you be willing and able to assist us with these programs? Your assistance is needed with teaching the kiddos the importance of wearing a life jacket. We situate this station in the shade under a popup tarp, supply lots of water and a great view of the lake. We need help with putting them in the kayaks and canoes and shoving them out into the waters and helping them to get out of the boat properly. We need folks that can be out in the water instructing the kids on how to use the paddles while maneuvering around a buoy. If you can help any of these days that would be grand. Here are the dates: April 30, May 21, May 28, June 8, 9, 10, 25, July 2, 9, 23, 30 August 20, 27.

Family Fun Days: Family fun days are days in which we offer activities to everyone in the park. We do a craft on the back porch of the park store, a fish-

ing activity, a kayaking activity, a hiking/scavenger hunt activity and more. I provide all the explanation and training you need prior to the program. We make it fun, right Helen! The families and kiddos are so appreciative. You become a believer in TPWD's motto: Life's better outside! Here are the dates and the programs. Please let me know of your availability and interests as soon as possible. We really can't offer these kinds of programs without your help. Abundant smiles.

April 2nd. 5:00 and go until 8:00pm. A Family Fun Day Fishing with Keith Miller a Texan who achieved catching a fish every day of the year last year in 2010 in Texas waters. He has the same goal this year; however he wants to include kids in the endeavor. So he is going from park to park to fish with kids. He visits Inks Lake North Pier on April 2nd. We need help with setting the kiddos up with a pole, casting, and catching and releasing the fish. Are you hooked?

April 23rd. 8:00am to set up, program starts 10:00am. Easter Egg Hunt. We have the eggs and the set up. We need some folks to help with crowd control. Elaine Barnhill is heading up this program. Give her a call with your interest. 512-793-4689.

April 30th. 10:00 to Noon. A Family Fun Day featuring the trails and fishing. If we get enough volunteers we will do an Angler Education program as well. The Time Travelers will be here at the Tee Pee. We need volunteers interested in teaching fishing skills and who like to do nature oriented scavenger hunts with kids.

Moonlight Paddles. 7:00 – 9:00pm (Time variations due to moonrises.) You can volunteer to help with this program or you can sign up and enjoy a gorgeous Hill Country moon rise from the seat of our canoe or your non-motorized boat. A guided tour by park naturalists will awaken your senses and soothe your soul. Must be 18 years or older. Cost \$15 per person. Space is limited. Reservations required. Call 512-793-2223. The monthly paddles are scheduled as follows; March 19, May 17, June 15, August 13. Sometimes we need safety and crowd control on the water and because the size of the group may break off into two groups. Or simply join us for the fun of it.

Breakfast with the Birds,

Just for FUN! You are welcome to enjoy Breakfast with the Birds with your very own Master Naturalist extraordinaire Sherry Bixler, every Friday at 8:00-10:00am March 18th through May 13th. Join Sherry for a birding tour on the park's electric boat. Along with her smile and birding expertise she provides delicious coffee and breakfast munchies.

The spring migration is starting to pick up and mornings are simply stellar on the lake. To make your reservation call Inks Lake Park Headquarters 512-793-2223, cost \$16-\$20. Space is limited.

May 21st. 9:00am to 1:00pm. Texas Outdoor Family will be here with a large group of families. We need assistance teaching them to kayak and geocache. The same day, we will also need help with the Regina Regatta, a fundraiser in memory of Wade Hitler's former wife. We can use some help with managing the activities and flow of participants.

May 29th. 11:00am to 1:00pm. Celebrate Memorial Weekend with Families at the park. We will do a craft, kayaking and scavenger hunts throughout the park.

June 19th. 9:30-11:30. Fishing with a ranger and Dad. Got worms. We do. We just need some help putting them on their hooks. Dad only has two hands.

July 2nd. 9:00am-Noon. Parkwide Family fun day. Cool off at the waterfront and fishing pier and enjoy boating and fishing activities and games.

July 3rd. 9:30-11:30am. Bike Parade and picnic. Got kids and grandkids? Bring them along and help us to decorate their bikes and make a parade through the park. Crowd control needed. Afterwards join us and enjoy a picnic under the shade trees and picnic tables at park central. We will get out the sprinkler and the park's concessionaire, Chris' Landing, has cool treats for everyone.

Every Saturday starting in May through August 8:00-9:00pm. Presenters Needed for our Saturday evening amphitheater program. Everyone has a story to tell about their experiences with the natural world; about animals, plants, about camping, hiking, or boating. You don't have to be a professional speaker or expert. We are attempting an opportunity is for the campers to enjoy the tradition of going to the amphitheater to watch the sunset and hear a story from a friendly face. You have one. Please sign up to tell yours. We have lots of dates open. We have the means to set you up for a PowerPoint presentation if you need it. I will be glad to assist you in the development of your presentation if you would like. Otherwise, the stage is all yours for an hour.

Thank you for your continued support. Please call or email me. I love working with you.

carol.navarro@tpwd.state.tx.us 512-793-4689.

VOLUNTEER OPPORTUNITIES AND AT/EVENTS CALENDAR

Mike Childers

MARCH EVENTS & VOLUNTEER OPPORTUNITIES		APRIL EVENTS & VOLUNTEER OPPORTUNITIES	
Texas Rainwater Catchment Assoc. 2011 State Conf. Hill Country Youth Exhibition Center, Kerrville, TX	18th-19th	Family Fun Day - Fishing with Keith Miller Inks Lake State Park North Peir	2nd
Breakfast with the Birds w/Sherry Bixler Inks Lake State Park	Fridays, Mar 18-May 13 8-10am	Great Outdoors Program Inks Lake State Park	4th-6th, 13th-15th 9am-Noon
Native Plant Society - Monarch Butterflies Marble Falls Library	19th 1-3pm	Birding and Wilflower Society - Big Bend National Park Marble Falls Library	7th 10am-12pm
Moonlight Paddles Inks Lake State Park	19th Moonrise	Going Buggy Program Balcones Canyonlands NWR	9th 9:30am-2pm
Inks Lake State Park Company Picnic Chris's Landing in the park	20th Noon	TAS/FOB Field Trip Balcones Canyonlands NWR friendssofbalcones.org	10th 7:30-11:30am
Central Texas Water Conservation Symposium Cedar Park Recreation Center www.texaswater.org	22nd 8:30am-3pm	Monarch Monitoring Project Workshop Cibolo Nature Center, Boerne, TX	13th-15th
Bridges to Birding Balcones Canyonlands NWR	22nd - 23rd 8:45am-2:15pm	Going Buggy Program Balcones Canyonlands NWR	14th 9am-2pm
Amphibian Watch Classes Inks Lake State Park	23rd 3-9pm	Walk & Talk Nature Workshops(LCRA), Earth Day, free MkKinney Roughs LCRA Park, Bastrop, TX	16th 10:30am - 4pm
Conservation Easement Workshop Llano, TX	25th 1-4:30pm	Texas Outdoor Family Blanco State Park	16th-17th 9:30am - Noon
Lawn and Garden Show Burnet Community Center, Burnet, TX	26th 9am-3pm	Family Fun Day - Easter Egg Hunt Inks Lake State Park	Apr 23 10am
Bridges to Birding Balcones Canyonlands NWR	26th 9:30am-2pm	Songbird Festival Balcones Canyonlands NWR friendssofbalcones.org	Apr 29th-May 2nd
Kayaking and Canoeing Kids Days in the Park Ink Lake State Park	30th	Family Fun Day - Hiking, Fishing, etc. Inks Lake State Park	Apr 30 10am to Noon
FUTURE EVENTS & VOLUNTEER OPPORTUNITIES			
Amphitheater Programs, Saturdays Inks Lake State Park	May thru Aug 8-9pm	Going Buggy Program Balcones Canyonlands NWR	May 24 9am-2pm
Texas Ornithological Society Spring Meeting Junction, TX	May 5-7	Celebrate Memorial Day with Family Activities Inks Lake State Park	May 29 11am - 1pm
Bridges to Birding Balcones Canyonlands NWR	May 6 8:45am-2pm	Kayaking and Canoeing Kids Days in the Park Ink Lake State Park	June 8, 9, 10, 25
Flying Wild GSA Balcones Canyonlands NWR	May 7 9:30am-1:30pm	Moonlight Paddles Inks Lake State Park	Jun 15 Moonrise
TAS/FOB Field Trip Balcones Canyonlands NWR friendssofbalcones.org	May 8 7:30-11:30am	Fishing with the Range and Dad Inks Lake State Park	Jun 19 9:30-11:30am
Kids at the Hatchery Program Inks Dam National Fish Hatchery	May 9, 12, 16, 19 9am - 3pm	Parkwide Family Fun Day Inks Lake State Park	Jul 2 9am - Noon
Going Buggy Program Balcones Canyonlands NWR	May 13 8:15am-1:30pm	Kayaking and Canoeing Kids Days in the Park Ink Lake State Park	Jul 2, 9, 23, 30
Moonlight Paddles Inks Lake State Park	May 17 Moonrise	Bike Parade and picnic Inks Lake State Park	Jul 3 9:30-11:30
Texas Outdoor Family - Large Group Coming Inks Lake State Park	May 21	Moonlight Paddles Inks Lake State Park	Aug 13 Moonrise
Regina's Regatta Inks Lake State Park	May 21	Kayaking and Canoeing Kids Days in the Park Ink Lake State Park	Aug 20, 27
Texas Outdoor Family Inks Lakes State Park	May 21-22	Native Plant Garden Tour Burnet County	Oct 15
Kayaking and Canoeing Kids Days in the Park Ink Lake State Park	May 21, 28	Big Bend State Park Field Trip Big Bend State Park	Oct 30-Nov 4
2011 Intron'l Urban Wildlife Mgmt/Plan Conf Austin, TX www.urbanwildlife2011.org	May 22-25		

Please submit pictures, articles, reports, stories, calendar and event entries, etc. to chili865@gmail.com. Photos should have captions and appropriate credits. The deadline for submissions to each months newsletter is the 10th of the month and publication will be by the 15th.