Welcome to the Summer 2007 edition of RECHARGE!

As temperatures reach triple-digits in many parts of Arizona, I am reminded of how thankful I am for air conditioning, umbrellas, sunscreen and riparian areas. Although a seemingly odd collection, each offers us respite from the harsh sun that fills our summer skies! Unlike humans, many of our non-human counterparts cannot rely on A/C to escape the heat and therefore seek natural protection from the hot summer days amidst lush riparian vegetation. In addition to providing habitat to a diverse range of species, riparian areas help control non-point source pollution and stabilize stream channels as well as provide recreational opportunities for each of us to enjoy.

In April, I had the privilege of attending a conference sponsored by the Arizona Riparian Council titled *Climate and Riparian Areas: Connecting the Dots.* As a sense of urgency to establish baselines and complete “pictures” of what scientists have been observing persists, I believe water managers will become more dependent on volunteers to help amass this voluminous data record. Hearing the concern of scientists and land managers reminds me of how important the Master Watershed Steward contribution is to ensuring the health of our state’s watersheds so that all Arizonians can enjoy their beautiful scenery. If riparian areas interest you, please checkout our feature article (see p. 2) on the Verde River, as well as some interesting research and volunteer opportunities in riparian monitoring and assessment.

With less than 4% of the waterways in Arizona flowing perennially, let’s remember that riparian areas depend on streamflow to grow lush vegetation that attracts human and non-human species; both of which seek respite during Arizona’s hot summer days. As Stewards, we are educated about our watersheds and passionate about protecting the land and water within our watersheds. Let’s each work to ensure the health of our natural A/C system! If you have a particular watershed issue you’re concerned about, please contact me and we can together, along with other Stewards, work to identify a solution!

Other news include recent online improvements to our existing website featuring a *For Stewards* page. This *For Stewards* page will include information about our new *Travel Grants* (see p. 7), as well as access to the new *Volunteer Tracking* system where you will be able to input and retrieve your volunteer and continuing education hours.

To ensure that you are receiving the information about volunteer and continuing education opportunities, as well as statewide current events, the MWS staff has been working hard to improve our communication with our volunteers. *Continued on the back page...*
To develop the Verde Watershed Based Plan, NEMO worked with various watershed groups including the Yavapai County Water Advisory Council, the Verde Watershed Association, the Oak Creek Canyon Task Force, the Stewards of Public Lands and the Upper Agua Fria Watershed Partnership. NEMO gathered input from these groups and educated local land-use decision makers on the linkages between water quality and land use, as well as water quantity and supply. These decision makers can use NEMO products to make choices and take actions that will lessen non-point source pollution and protect our natural resources. The NEMO Watershed Based Plan for the Verde Watershed was completed in 2006 and is available for free. Download at: www.ArizonaNEMO.org.

The Verde Watershed is defined as the area drained by the Verde River into the Salt River and encompasses some of Arizona’s most popular destinations such as Oak Creek Canyon and Montezuma Castle. The watershed covers approximately 6,622 square miles and includes Mt. Humphrey, the highest point in Arizona at 12,617 feet. The Verde Watershed has varied topography, with over 50% of the watershed having a slope greater than 15%, and 32% having a slope less than 5%. Average annual temperature is 55.1°F, and average annual precipitation is about 18.6 inches per year. Coniferous forest is the dominant vegetation type with nearly 60% of the vegetation communities classified as Conifer Woodland or Forest. The largest land owners are the National Forest (about 56%), and private land owners (about 23%). The Verde Watershed has a long history of mining, with 585 mineral extraction mines recorded with the Office of the Arizona State Mine Inspector, although most mines are no longer active. The riparian corridor along the Verde River provides an excellent habitat to many animal species including the endangered Mexican Spotted Owl, Gila Chub and Razorback Sucker. Approximately 95% (8,459 miles) of the streams in the watershed are intermittent or ephemeral. Only about 6% (578 miles) of streams are perennial, mostly restricted to the main stem of the Verde River and its major tributaries. Due to high species diversity, as well as the historic and cultural values associated with the Verde River, a 40-mile section was listed as Arizona’s only Wild & Scenic River.

Based on the Arizona Department of Environmental Quality (ADEQ) 2004 List of Impaired Waters, there are three river reaches and two lakes in the watershed that are not attaining state water quality standards: East Verde River from Ellison Creek to American Gulch (selenium), Granite Creek from the headwaters to Willow Creek (DO, E. coli, mercury, turbidity), the Verde River from Bartlett Dam to Camp Creek (selenium, copper), Watson Lake (DO, pH, nitrogen), and Whitehorse Lake (DO, ammonia, turbidity).

Continued on following page...
A TMDL will be developed for each of these water bodies, which will define the maximum amount of each water quality parameter or pollutant that can be carried by a waterbody without causing an exceedance of water quality standards.

As part of the NEMO Watershed-based plan, each 10-digit HUC subwatershed is evaluated for potential water quality risks due to four main constituents: metals, sediment, organics and selenium. These constituents represent the main categories of water quality monitoring conducted by the ADEQ for compliance with Clean Water Act water quality standards. Actual water quality standard exceedances, proximity of mines or human land use (urbanization, grazing and agriculture) to riparian areas, land ownership, and erosion potential are used to determine risk.

Education about proper land use and management is the best way to protect water quality. To protect riparian areas from sediment (i.e. turbidity) and organics (i.e. nitrogen) pollution, Master Watershed Stewards can implement recommended BMPs such as: construct filter strips and fencing around important water bodies; revegetate and use fabrics and rock riprap on eroded landscapes; install straw bales and dig trenches to capture sediment. In addition, Stewards can help lead public education campaigns about septic system repair, fertilizer use, livestock grazing and water conservation.

The large percentage of privately owned land and the statewide trends means continued growth in the central and southern portions of the watershed. Urban areas can contribute greatly to non-point source water pollution, as well as decrease available water supplies; riparian health may be vulnerable due to increased pollutants and decreased streamflow. These areas may require the implementation of BMPs and watershed improvement projects in the future. The NEMO Watershed Based Plan can be an excellent resource to Stewards in their efforts to protect water quality by identifying potential water quality problems, locations, and BMP projects.

For more information regarding the Verde Watershed or the NEMO program in general, please contact:
Kristine Uhlman
kuhlman@ag.arizona.edu
Phone: 520-792-9591 ext. 51
www.ArizonaNEMO.org

AND THE SUMMER PHOTO CONTEST WINNER IS...
David Griggs of Prescott Valley

David took this photo looking downstream in beautiful Oak Creek Canyon.

Thank you all for participating in the summer photo contest. We appreciate your entries and those not chosen can be entered at a later date.

We look forward to seeing photos for the Fall contest!
MWS Learning goes On-line
by Theresa Crimmins

On-line Distance Learning Modules for the Arizona MWS Program
On-line learning modules designed to enhance and supplement MWS courses are under development and are planned for participant use by fall 2007. The information in the website is designed to supplement in-class learning by providing training in four core modules:

- Climate
- Soils
- Streams
- Biota

What’s covered?
In each module, information is provided in the following areas:

- Pertinent background information on the subject and its connections within the watershed ecosystem;
- An overview of common protection, conservation, and restoration practices specific to the subject and jumping-off points for MWS participants to take action;
- A description of subject-specific datasets currently being collected and their potential relevance to MWS activities;
- The information necessary to collect relevant, accurate data.

Modules conclude with on-line quizzes designed to assess comprehension. These modules will be presented in conjunction with MWS courses and will also be available as continuing education credit for certified Master Watershed Stewards.

This project is funded by the UA Technology and Research Initiative Fund Water Sustainability Program and the UA TRIF “Anyplace Access for Arizonans” Initiative.

ARIZONA CLIMATE FACTS
Summer doesn’t officially start until June 21st, but it sure feels like it’s been summer for awhile. Another way to think of the start of our summer is when we have the first 100-degree day – so when does that actually happen? Depends on where you live...

<table>
<thead>
<tr>
<th>City</th>
<th>On Average</th>
<th>Earliest 100° day</th>
<th>Latest 100° day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoenix</td>
<td>May 13th</td>
<td>March 26th, 1988</td>
<td>June 18th, 1913</td>
</tr>
<tr>
<td>Tucson</td>
<td>May 26th</td>
<td>April 19th, 1989</td>
<td>June 22nd, 1905</td>
</tr>
<tr>
<td>Yuma</td>
<td>June 9th</td>
<td>March 17th, 2007</td>
<td>no data</td>
</tr>
<tr>
<td>Kingman</td>
<td>~July 5th</td>
<td>May 3rd, 1947</td>
<td>no data</td>
</tr>
<tr>
<td>Show Low</td>
<td>n/a</td>
<td>May 31st, 1969</td>
<td>July 14th, 2004</td>
</tr>
<tr>
<td>Willcox</td>
<td>June 13th</td>
<td>May 3rd, 1947</td>
<td>June 26th, 1935</td>
</tr>
</tbody>
</table>

* There are only two 100° days recorded for Show Low, AZ.
Who (are they)?
*Rana catesbeiana* (American bullfrog). Bullfrogs are the largest frog species found in the United States ranging up to 8 in while in a sitting position (more typically 3.5-5 in.). They come in many shades of brown and green with diffuse spotting or mottling on the back but they lack the discreet spots of native leopard frogs. They have a complex life cycle involving aquatic eggs and tadpoles after which they metamorphose into terrestrial adults. Bullfrogs are prodigious breeders with females producing up to 20,000 eggs!

What (are they doing here)?
Bullfrogs are native to eastern North America and were introduced for sport throughout the western U.S. including Arizona during the early 1900’s. They have subsequently spread throughout most of Arizona’s major watersheds.

Where (are they found)?
They inhabit calm, permanent water including creeks, streams, stock ponds and lakes.

Why (are they a problem)?
Bullfrogs are voracious predators that eat just about anything they can fit in their mouth such as insects, other amphibians and reptiles (including rattlesnakes!), rodents, and even birds and bats! Bullfrogs pose serious threats to many of Arizona’s native species especially leopard frogs. Aquatic environments in Arizona historically supported several species of leopard frogs but today more often support bullfrog populations.

Water gardening and backyard ponds have become a popular landscaping hobby and have led, in some cases, to the translocation and spread of bullfrogs and other exotics. Pond owners should educate themselves to problematic exotic species (both plant and animal) and opt against stocking them into their ponds. More information on backyard ponds and exotic pests can be found at:

How (do we get rid of them)?
Bullfrogs should never be moved from one site to another in the wild and captive animals should never be released as prohibited by Arizona law. Bullfrogs are often “hunted” for consumption of their legs. You can currently harvest unlimited numbers of bullfrogs with a valid Arizona fishing license (but see official regulations for some exceptions).

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**Arizona Stream Fact**

Did you know that only 4% of all the river and stream miles in Arizona are perennial? Perennial describes water that flows year round. The other 96% of stream miles are ephemeral, which only flow in response to precipitation events (ADEQ, 2007)!
Please welcome Garry Forger as our outstanding volunteer for the summer season of 2007! Garry has been actively volunteering with MWS since he graduated from the first Pima County class in the fall of 2005, although he has been a part of the University of Arizona community for over 10 years where he has held several positions. In his current position as a Development and Grants Officer for the Learning Technology Center, he helped secure a TRIF grant to develop on-line modules to supplement MWS Program courses and provide continuing education opportunities to all Stewards (please see MWS Learning goes On-line, p. 4). In addition, he works closely with our Volunteer Coordinator, Meghan Maloney, to update volunteer opportunities and current events posted on our blog (http://blog.ltc.arizona.edu/masterwatershedstewards/).

In addition to his Information Technology expertise, Garry also has a passion for photography that has lead him to Saguaro National Park to collect photopoint data. This repeat photography project provides researchers with visual data needed to monitor short and long-term changes; photos are correlated with vegetation data, rainfall statistics and wildfire trends over a 30-year period from 1976-2006. One noticeable change is the appearance of more grasses in recent years, although researchers are uncertain why this is happening. Thanks to Garry and other photopoint volunteers who are helping researchers complete the picture of watershed change!

Photopoint example from Saguaro National Park (Photo on left taken in 1976, on right 2006):

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Volunteer Spotlight

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Watershed Sudoku !!

For your reading entertainment, we have created Watershed Sudoku! This is similar to the regular game, except you have to organize the elements of a watershed instead of just straight numbers. The key is below, Enjoy!

```
+ 1 2 3 4 5 6 7 8 9
^ @ S ~ S ^ S ~ @  
^ 7 ~ 7 ^ S
^ 7 ~ S
^ S @ ±
```

Please visit www.cals.arizona.edu/watershedsteward to view the puzzle answer. Good luck!
Volunteer Opportunity in the Tucson Area
Urban Washes
by Jonathan Martin
Master Watershed Steward, Pima County
Graduate Student, UA School of Natural Resources

HELP WANTED: George Zaimes (UA), Michael Crimmins (UA), and Doug Green (ASU), have designed a project that will be used to identify the climatic and biotic impacts urbanization has on ephemeral riparian areas in the Sonora region. They are in need of volunteers who can sew, identify desert shrubs and grasses, and can work with a hammer in one hand whilst swinging a GPS unit in another . . . they are in need.

WHEN/WHERE: The project will begin before the 2007 monsoons make their presence known in our afternoon skies, and will end before the onset of winter in 2009. The project will take place in Marana (there are three wash sites with a varying adjacent housing densities).

Specific duties include:
- Preparing and installing temperature sensors above and below ground
- Installing rain gauges
- Mapping channel cross-sections
- Setting up vegetation plots
- Identifying plants
- Sewing leaf-litter into small nylon bags
- Representing the fine and noble breed that is the Master Watershed Steward

This is an ongoing project, and anybody who is willing to help see this through is encouraged to write to the Steward/grunt in charge to join a mailing list that will detail upcoming volunteer events. Please send Jon Martin an email with the subject header, “URBAN WASHES,” to his address: jrm5@email.arizona.edu (or call him at 520-323-4549).

Muchas Gracias y viaje con suerte,
Jon

MWS Travel Grants Now Available!

If you remember back to the Spring RECHARGE, I wrote about the working goals we’ve identified for Arizona MWS. Two of our three main goals focused on our volunteers. To improve volunteer communication and retention, as well as the impact of Stewards, we are now offering MWS Travel Grants to help certified Stewards continue their watershed education and meet the University Policy of attending 10 hours or 1 CEU of new education and/or training each year. This continuing education unit (CEU) serves as a benchmark for proficiency; it ensures that MWS volunteers remain highly skilled and that each Steward stays informed about recent scientific findings, as well as changes within our watersheds.

MWS Travel Grants are a great opportunity to attend events throughout the state, depending on your interests and goals within the MWS Program, not just your location. For an application, go to the For Stewards section of the MWS website.

If you have any comments or questions regarding these travel grants or the MWS continuing education policy, please contact Candice at (520) 621-1268 or by email: candicer@cals.arizona.edu
Continued from the front page ...

We have sent out postcards and email requests to update contact information, so if you’re still not a listserv member, please let us know and you will be added. The listserv and blog provide a forum for distributing important MWS announcements, featuring a calendar to view events and opportunities. Thank you!

Sincerely,
Candice Rupprecht
MWS Statewide Coordinator
candicer@cals.arizona.edu
520.621.1268

P.S.
If you have ideas, comments, suggestions, events, or would like to assist in the creation of the newsletter, please contact Meghan at (520) 621-7205 or maloneym@cals.arizona.edu.
You will receive MWS credit for any hours spent working in the newsletter.