



JANUARY 2013 NEWSLETTER

CONTENTS

[View Point:](#)

[Government Goings-On](#)

[AHS Foundation](#)

[AHS membership 2013 renewal reminder](#)

[Phoenix chapter news](#)

[Phoenix Chapter Officer Election Results](#)

[Tucson chapter news](#)

[Shallow Groundwater Areas in Eastern Pima County, Water Well Inventory and Pumping Trend Analysis](#)

[Tucson 2013 AHS Symposium Save the Date](#)

[Flagstaff chapter news](#)

[2012-2013 Jahn's Distinguished Lecture](#)

[Hydro-news](#)

[Arizona Geological Survey's Featured Article: Evolution of the Gila River Watershed](#)

[Post-Tectonic Landscape Evolution in Southeastern Arizona: When Did a River Start to Run Through It?](#)

[AZGS: Improved earth fissure maps for Cochise and Pinal Counties, Arizona](#)

[WRRC's 2013 Annual Conference Takes on "Water Security from the Ground Up"](#)

[Quenching the thirst of Western cities stirs debate](#)

[Some 40 million people rely on the Colorado River for drinking water, crop irrigation, ranching, tourism, energy and business](#)

[Strategic vision for water is vital for Arizona to prosper](#)

[Nonprofit tech innovators inspire new philanthropy](#)

[Water, climate change project gives new life to Biosphere 2](#)

[Glass-enclosed facility will be used to study water cycle, climate change](#)

[Bonds target flood threat in Flagstaff](#)

[\\$10 mil to fund efforts to avoid fire damage](#)

[Report: Climate changing watersheds](#)

[Debate rages over mine project](#)

[Supporters tout Florence jobs; opponents cite pollution fears](#)

[Climate change already playing out in West, report says](#)

[Change 'more dramatic' in winter than previously thought, ecologist says](#)

[How Did Grand Canyon Form? Flood Didn't Carve Giant Gorge, Geologist Says](#)

[Job Postings](#)

[Additional Information](#)

GOVERNMENT GOINGS-ON

ADWR has developed a draft concept paper at localized groundwater declines as part of the Fourth Management Plan. You can read it at:

http://www.azwater.gov/AzDWR/Legal/Public_Meeting_Notices/documents/EnhancedAquiferManagement-rechargeincentiveconcept.pdf .

The ADWR draft paper takes aim at the Recharge Program. One of the major problems with the original design of the program is that water can be stored in one locale, accumulating Long-Term Storage Credits (LTSCs), and recovered in another, even another sub-basin. Many areas are experiencing water level declines, while water levels rise in others. Some of the water stored underground may never be physically recovered, while pumping of LTSCs will likely mean major groundwater declines in several areas where storage has not occurred. In other words, the system of paper water transfers from one area to another is breaking down.

ADWR proposes to address the widely-acknowledged problem by manipulating the “cut to the aquifer” concept. Built into the recharge statutes is a percentage of water (5%) that can never be pumped as LTSCs, as a general benefit to aquifer health. You only get to the full amount if your well is within the “area of impact,” a zone one mile around the boundary of the Underground Storage Facility—a totally arbitrary concept. ADWR suggests that by increasing the percentage to 10% withheld from recovery when pumping is outside the one mile area of impact, and even more (to 20%) for recovery outside the sub-basin, storers will be encouraged to recover near the USF. The imbalance of recharge vs. recovery that leads inevitably to localized groundwater level declines can be ameliorated. And at first glance, this sounds workable. Certainly it would be administratively simple for ADWR, because the factors would be well-defined. You could put them in a spreadsheet.

But we all know that recharge and recovery are anything but simple; these are complex hydrogeological operations. Each situation is unique. And the area of impact is never just a mile out from the USF boundaries. By moving in the direction of administrative simplicity, ADWR is taking the wrong approach. Stabilizing groundwater declines is a moving target, and broad simplistic approaches will not work. What is needed to address the imbalance problem is not a spreadsheet, but focused hydrogeological studies on each situation to understand how the water is introduced into the aquifer and what happens when specific pumps are turned on and what is likely to occur over time, followed by regular evaluations based on monitoring data. We need more hydrology, not less.

To take this approach is to diminish the science of hydrology and its critical role in addressing water resources issues in Arizona. Hydrologists should be concerned that science is being taken out of the decision-making process. ADWR needs to revise their concepts to put science first.

Alan Dulaney,
City of Peoria

[Top of the Document](#)

AHS MEMBERSHIP 2013 RENEWAL REMINDER

The New Year is here, so if you haven't already, it's time to renew your AHS membership! Please remember that 2013 membership dues were included in both full registration and one day 2012 Symposium registration fees, so those of you who attended the symposium do not need to renew. Membership dues can to be renewed online at http://www.azhydrosoc.org/join_ahs.html

Or by mail to:

Arizona Hydrological Society
P.O. Box 1882
Higley, AZ 85236

Thank you for your continued support of the Arizona Hydrological Society!

PHOENIX CHAPTER NEWS

Please join us for the Phoenix chapter's annual kick-off meeting to be held on **Tuesday, January 8, 2013**, at **Nello's, in Tempe** (northeast corner of McClintock & Southern, just north of U.S. Highway 60 (the Superstition Freeway)). Please join us for a beverage, share business cards, and help AHS plan for a great new year!

- Location:** Nello's
1860 E. Southern Avenue
Tempe, AZ 85282
- Event:** **AHS Phoenix Chapter
Annual Kickoff Meeting
Food & Drink Provided By
AHS Phoenix Chapter**

Open Discussion Of Plans For Phoenix
Chapter Activities in 2013
- Chapter Board Meeting:** ***No formal Board Meeting This Month***
- Happy Hour & Dinner:** 5:30 PM – 7:00 PM
- Program:** 7:00 PM – 8:30 PM
- Cost:** **No cost to AHS Members!**

Please RSVP to Michele Robertson at mrobertson@elmontgomery.com or 480-948-7747.

Hope to see you there!

Future Event Calendar (see also calendar on www.azhydrosoc.org)

- February and beyond – maybe you? Please contact [Tom Walker](#), Phoenix Chapter Vice President, if you would like to give us a presentation or if you know anyone else who could use an audience.

[Top of the Document](#)

PHOENIX CHAPTER OFFICER ELECTION RESULTS

A big **THANK YOU** to our dedicated Phoenix Chapter officers – we appreciate your service! Here are the results from the 2013 officer elections.

- President: **Summer Waters**, University of Arizona Cooperative Extension, Maricopa County
- Vice-President: **Tom Walker**, Fleet-Fisher Engineering, Inc
- Treasurer: **Michele Robertson**, Montgomery & Associates (write-in)
- Secretary: **David Sampson**, Decision Center for a Desert City, Global Institute of Sustainability, ASU

Phoenix Chapter Board Members

- Rich Siegel**, Salt River Project
- Matt Beversdorf**, Salt River Project

Phoenix Chapter Corporate Board Representatives

- Mike Hulst**, Allwyn Environmental

TUCSON CHAPTER NEWS

The next meeting of the Tucson Chapter will be held on Tuesday, January 8. Please join us for pizza and to talk water!

Location: Montgomery & Associates
1550 East Prince Road
Tucson, AZ

Social half hour: 6:00 PM

Program: 6:30 PM

Shallow Groundwater Areas in Eastern Pima County, Water Well Inventory and Pumping Trend Analysis

Claire Zucker, Pima Association of Governments' Sustainable Environment Director

The study identifies 32 shallow groundwater areas, grouped into 10 regions and uses ADWR and PAG well data to delineate water level changes, water use trends, well densities and drilling histories. The report provides a useful tool for broadly comparing the basins, but when data are available; it also shows drilling histories and hydrographs for individual basins. With continued warming and drought, there will undoubtedly be increased competition for water resources in these delicately balanced systems.

Claire Zucker has over 25 years experience working as a hydrologist and watershed/land use planner, more recently expanding to sustainability planning by adding air quality, invasive species issues and travel demand elements of transportation. Ms. Zucker works with municipalities, agencies, and environmental community members throughout eastern Pima County with an emphasis on building stronger community understanding and engagement in environmental resource and sustainability issues. She received her Bachelor of Science as a College Scholar in the Department of Earth and Planetary Sciences, University of Tennessee and her Masters in Geological Sciences from the University of California, Santa Barbara. Ms. Zucker also serves on the boards of directors for the Southern Arizona Buffelgrass Coordination Center, Conserve to Enhance, Tucson Audubon Society and Tucson Friends of Traditional Music.

[Top of the Document](#)

TUCSON 2013 AHS SYMPOSIUM SAVE THE DATE

Save the
Date



SHIFTING BOUNDARIES: Recalibrating the Hydrologic Approach

September 18-21, 2013

Doubletree Reid Park
Tucson, Arizona



ARIZONA HYDROLOGICAL SOCIETY
26TH ANNUAL SYMPOSIUM

**Abstracts accepted
beginning
March 2013**

Symposium website
and registration page
launching soon!
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for updates.

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[Top of the Document](#)

FLAGSTAFF CHAPTER NEWS

We have not yet decided if we will have a Chapter Meeting in January. Please monitor the AHS-Flagstaff web page and AHS LinkedIn Group to see when the next meeting will be scheduled.

[Top of the Document](#)

2012-2013 JAHN'S DISTINGUISHED LECTURE

The Flagstaff Chapter is pleased to announce that, in collaboration with Northern Arizona University (NAU), they will be sponsoring, in part, the 2012-2013 Jahns Distinguished Lecture titled ***The Mountains are Falling Apart: A Spectrum of Mass Failures from Landslides through Deep-Seated Gravitational spreading (Sackung), to "Unfolding" of Folds***. This lecture will be given by Dr. James McCalpin at 1600 MST on Tuesday, January 29, 2013, in Room 103 of Building 12 (Frier Hall) on the NAU campus.

Biography of Dr. McCalpin from Amazon website – James McCalpin (aka Dr. Rox) is a geologist who performs research and consulting in geological hazards, especially earthquakes and landslides. He studied geology at the University of Texas (BA, 1972), University of Colorado (MS, 1975), and the Colorado School of Mines (PhD, 1981). He was a field geologist for US Geological Survey in Alaska and California (1976-78), and later County Geologist for Jefferson County, Colorado (1981). Then came 10 years as a professor at Utah State University (1982-1991). Since 1991 he's been a full-time consultant in Colorado, heading GEO-HAZ Consulting (www.geohaz.com). For GEO-HAZ projects he travels the globe, having visited 40 countries in the past 22 years, and having learned bad words in many languages and dialects.

Paleoseismology, edited by GEO-HAZ's President, Dr. James P. McCalpin, has become the international standard reference in the field. First published in 1996 by Academic Press, the book was revised and enlarged in 2009 (2nd Edition by Elsevier Publishing). Dr. McCalpin also directs the Crestone Science Center in Crestone, Colorado (www.crestonescience.org). His latest book (***Crestone: Gateway to the Higher Realms***; 2011) is a tell-all guidebook to Crestone, surely one of the wildest, strangest, and most beautiful places on the planet.

AHS-Flagstaff will be hosting a reception after the talk tentatively at the Lumberyard Brewing Company, 5 South San Francisco Street, Flagstaff. Hors d'oeuvres will be provided by AHS-Flagstaff. There will be a cash bar. We hope to see you there for what promises to be a fascinating lecture.

[Top of the Document](#)

HYDRO-NEWS

ARIZONA GEOLOGICAL SURVEY'S FEATURED ARTICLE: EVOLUTION OF THE GILA RIVER WATERSHED

AZGS – Dec 26, 2012

[Post-Tectonic Landscape Evolution in Southeastern Arizona: When Did a River Start to Run Through It?](#)

Article Author(s): [Matthew C. Jungers](#)

Southeastern Arizona's Basin and Range is composed of high relief, rugged mountain ranges – e.g., the Santa Catalinas, Rincons, Galiuros, Pinaleños, Santa Ritas, Chiracahuas – that are separated by intervening tributaries of the Gila River.

[Read more](#)

[Top of the Document](#)

AZGS: IMPROVED EARTH FISSURE MAPS FOR COCHISE AND PINAL COUNTIES, ARIZONA

AZGS – Dec 27, 2012

NEWS RELEASE: Improved earth fissure maps for Cochise and Pinal Counties, Arizona

Contact: Michael Conway (520.209.4146; michael.conway@azgs.az.gov)

Tucson. Earth fissures continue to be a growing problem in Cochise County as new fissure areas have been identified in the past two years. Earth fissure maps for two such areas, Croton Springs, Willcox Basin, and Elfrida, Douglas Basin, are now available as free PDF downloads at the [Arizona Geological Survey \(AZGS\) Document Repository](#).

AZGS's earth fissure map format has been substantially revamped to make the maps easier to use and to include subsidence maps for valleys hosting earth fissures. The new map format incorporates a high-resolution, air photo base map compiled from 1-meter resolution National Agriculture Imagery Program imagery (2010), and ground subsidence maps from the Arizona Department of Water Resource InSAR (Interferometric Synthetic Aperture

Radar) satellite land subsidence monitoring program. Subsidence, as shown on the InSAR inset map, is measured in centimeters.

The [Picacho-Friendly Corners](#) area, Pinal County, and [Three Sisters Buttes](#), Cochise County earth fissure study area maps are reissued in this new map format as well.

Arizona Geological Survey geologists mapped about 1.6 miles (~8,400 feet) of continuous and discontinuous earth fissures in the Elfrida (~6,800 feet) and Croton Springs (~1,600 feet) areas.

In Cochise County, earth fissure maps are available for the following areas:

- [Dragoon Road](#)
- [Three Sisters Buttes](#)
- [Bowie-San Simon](#)
- [Elfrida](#)
- [Croton Springs](#)

The Dragoon Road and Bowie-San Simon maps will be reissued in the new format in the near future. The Sulphur Springs North earth fissure study area just north of Willcox in Cochise County remains to be mapped.

AZGS's [Earth Fissure Viewer](#) shows the footprints of all previously mapped fissure study areas and provides links to free, downloadable PDFs. A Geographic Information System (GIS) file showing the [locations of mapped earth fissure traces in Arizona](#) should be available for download shortly.

Besides posing a threat to infrastructure and livestock, fissures are an illegal dumping ground for tires, appliances, construction debris, manure and other sundry items. Because the fissures are believed to extend down to the water table, earth fissures represent a potential threat by serving as a conduit from surface runoff contaminating groundwater resources.

The AZGS Earth Fissure Mapping Program will continue to update maps as earth fissures grow and new ones form. AZGS geologists will begin focusing on ways to predict where and when the fissures will appear and work with local building officials and engineers on way to mitigate existing earth fissures to minimize their impacts.

BACKGROUND INFORMATION

Earth fissures are cracks, seams, or separations in the ground c differential land subsidence that accompanies extensive groundwater harvesting. The earliest appearance of fissures in Arizona was near Eloy in 1927. Individual fissures range in length from hundreds of feet to miles, and in width from inches to tens of feet. Currently, geoscientists believe that fissures initially form at the groundwater table and then propagate upwards hundreds of feet to the surface. Because fissures are commonly oriented perpendicular to local drainages, they are capable of capturing surface runoff. In-rushing waters may result in rapid erosion of sidewalls and gully development causing dramatic and sudden changes in fissure geometry -- length, depth, and width.

Earth fissures are a geologic hazard in the arid valleys of central and south-central Arizona. As population centers expand into subsiding areas of basins/valleys, residents and structures are placed in closer proximity to fissures. Property owners are encouraged to 1) set structures as far away from fissures as possible, and 2) prevent water from entering fissures.

Reports of earth fissures are confined to Cochise, Maricopa, Pima, and Pinal counties in central and south-central Arizona. In 2007, AZGS released 1:250,000-scale planning maps of the four counties showing the approximate locations of earlier reported earth fissures. These earth fissure planning maps are available free, online at the Earth Fissure Center at www.azgs.az.gov/efc.

AZGS is charged by state statute with mapping earth fissures in Arizona.

[Top of the Document](#)

[WRRC'S 2013 ANNUAL CONFERENCE TAKES ON "WATER SECURITY FROM THE GROUND UP"](#)



Water security is a large and complex issue encompassing the many efforts required to assure a safe, reliable, and sufficient water supply for people, the environment and the economy now and in the future. The Arizona Water Resources Research Center's 2013 Annual Conference will tackle this important topic. On March 5, 2013, the conference, "Water Security from the Ground Up", organized in collaboration with the United States Geological Survey, Arizona Water Science Center, will take place at the University of Arizona, Student Union Memorial Center. To examine water security from multiple angles, the conference will present perspectives from scientists and water policy and management experts on sustainable use, augmentation and protection of water resources from over-exploitation, contamination and other hazards, including drought and climate variability. Speakers will discuss issues of water policy and the role sound governance plays in safeguarding human values and ecosystem functions. Experts will inform us on current trends and strategies for securing the supplies to support quality of life for future generations.

Please join us as we explore the path to water security.

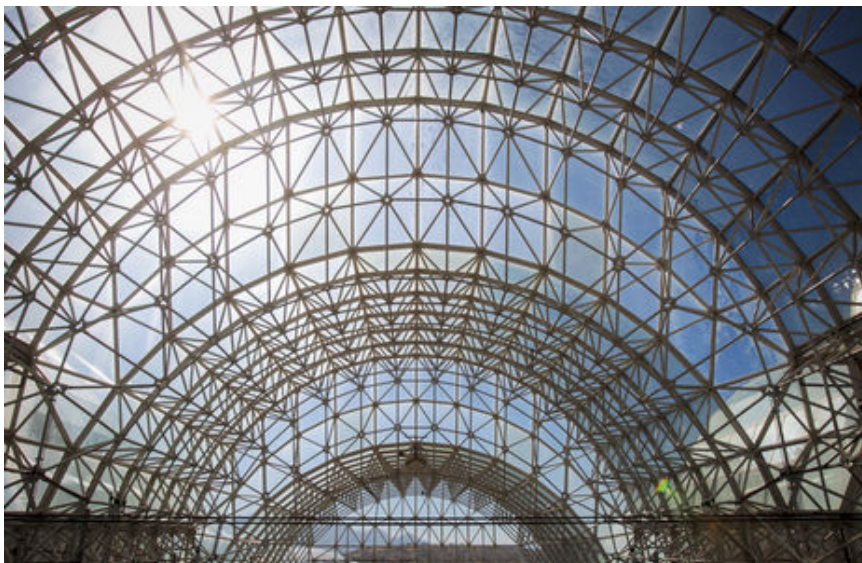
[Top of the Document](#)

WATER, CLIMATE CHANGE PROJECT GIVES NEW LIFE TO BIOSPHERE 2

Glass-enclosed facility will be used to study water cycle, climate change

By Brandon Loomis
The Republic | azcentral.com
Mon Dec 3, 2012 8:28 AM

unlock the secrets of Earth's water cycle.



ORACLE - The massive greenhouse that once fed researchers who lived in the sealed-off world of Biosphere 2 is getting new life as a grand experiment to

The University of Arizona last week commissioned the Landscape Evolution Observatory. The \$7.5 million project under a half-acre of glass includes three identical "watersheds" sculpted from ground volcanic rock and loaded with thousands of subsurface sensors.

Its builders consider it one of a kind because the structure's near-total containment will allow for tracking every drop of water through intentional changes in the enclosed environment. The results could help them understand how climate change may affect the Sonoran Desert or the Colorado River Basin as well as more basic questions such as how plant and microbial life alter

Earth's natural systems.

"We will discover how water and life interact at the Earth's surface to sustain life on Earth," said Peter Troch, science director for Biosphere 2.

LEO, as they're calling it, is a revolutionary tool for geologists, hydrologists and ecologists.

"It's the first lab rat for the Earth sciences," said Travis Huxman, a University of California-Irvine biologist and former director of Biosphere 2. The closed-system research facility was built in the mid-1980s to study space colonization [technology](#), and the University of Arizona has conducted Earth sciences research there since 2007.

Read more: <http://www.azcentral.com/community/pinal/articles/20121130arizona-biosphere-water-project.html>

[Top of the Document](#)

DEBATE RAGES OVER MINE PROJECT

Supporters tout Florence jobs; opponents cite pollution fears

by **Craig Harris** - Dec. 5, 2012 10:58 PM
The Republic | azcentral.com

FLORENCE - More than 300 people packed Florence High School's gym Wednesday night to voice their displeasure with or support for a controversial, proposed, underground copper mine within the town limits.

Dozens of opponents donned red shirts, saying the color was a symbol to stop the project. Coincidentally, it's also one of the colors for Florence High, giving critics of the mine a unified look against their out-of-town opponent: Curis Resources, a Canadian company.

Curis is seeking to open a mine that would inject sulfuric acid hundreds of feet underground, leaching copper from the soil so that it can be sucked to the surface for processing.

Curis purchased property near the geographic center of Florence for the project and secured a mineral lease on unincorporated state trust land that is surrounded by the municipality.

The project was voted down by Town Council members, but the town has no jurisdiction over state trust land. Surrounding real-estate developers also oppose the project, citing environmental concerns.

Read more: <http://www.azcentral.com/arizonarepublic/local/articles/2012/12/04/20121204debate-rages-over-mine-project.html#ixzz2Gbeub4Lq>

[Top of the Document](#)

QUENCHING THE THIRST OF WESTERN CITIES STIRS DEBATE

Some 40 million people rely on the Colorado River for drinking water, crop irrigation, ranching, tourism, energy and business



AP 12/12/12 By Ken Ritter

LAS VEGAS — Rising demand and falling supply are spurring talk in the arid West of outside-the-box ideas including piping in water from the nation's heartland and towing Arctic icebergs south to help such thirsty U.S. cities as Denver, Los Angeles, Las Vegas and Phoenix.

But amid ongoing drought, some advocates are criticizing a report being released Wednesday on the next 50 years of Colorado River water use as a "fundamentally flawed" analysis based on inflated projections of the amount of water in the river and the number of people in the region.

"States cooked the books to show higher demand for water consumption to set up a federal bailout on expensive water projects," said Molly Mugglestone, director of the advocacy group Protect the Flows. "Meanwhile, the states failed to account for river flow that will be required to sustain our multi-billion dollar recreation economy."

Another advocacy group, the Environmental Defense Fund, was more measured in its expectations for the Colorado River Basin Water Supply and Demand Study.

"The Colorado River is the lifeblood of the dry West," said Dan Grossman, an official with the Boulder, Colo.-based organization. He said the report would show the critical need for increased conservation.

"We can't keep bleeding the river dry," Grossman said. "The basin study says loud and clear that it's time for a new approach that puts conservation first."

Interior Secretary Ken Salazar was due to head a media briefing about the report being released as part of a three-day Colorado River Water Users Association conference.

Read more at <http://news.msn.com/us/quenching-the-thirst-of-western-cities-stirs-debate#tscptme>

[Top of the Document](#)

STRATEGIC VISION FOR WATER IS VITAL FOR ARIZONA TO PROSPER

Viewpoints

by **Sandra Fabritz-Whitney, John Sullivan, David Modeer, Kathleen Ferris and Warren Tenney** - Dec. 15, 2012
04:07 PM

On its 1,450-mile journey from the mountains of Colorado and Wyoming, through Arizona and into Mexico, the Colorado River supplies water to nearly 40 million people in seven states and Mexico.

The river irrigates millions of acres of farmland, generates significant hydroelectric power and nourishes riparian habitats throughout the Southwest. Its famed rapids and canyons offer whitewater rafting, and the lakes created by its dams provide open water for boating and recreation.

Because of these essential and wide-ranging benefits, the river has spawned numerous debates about its future. A new chapter in these discussions is emerging with the release last week of the U.S. Bureau of Reclamation's most comprehensive study of the Colorado River to date.

Read more: <http://www.azcentral.com/arizonarepublic/viewpoints/articles/2012/12/15/20121215strategic-vision-water-vital-arizona-prosper.html#ixzz2GbZDNuvv>

[Top of the Document](#)

BONDS TARGET FLOOD THREAT IN FLAGSTAFF

\$10 mil to fund efforts to avoid fire damage

By Brandon Loomis

The Republic | azcentral.com

Mon Dec 17, 2012 3:44 PM

FLAGSTAFF - This mountain city lies in the path of a flood waiting to happen, and residents are plunking down \$10 million in hopes of ending the risk.

Bonds approved Nov. 6 by 73 percent of city voters will pay to thin and restore health to 11,000 acres in and around Coconino National Forest that are vital to the city's safety and water supply. City officials say the work could prevent tens if not hundreds of millions of dollars in flood damage.

The fear is a forest fire that kills trees and consumes ground cover and other vegetation, priming a mountain for flooding when rainwater rushes down it unimpeded. The 15,000-acre Schultz Fire, which began June 20, 2010, showed how it can happen in just a month: Denuded soil formed a waterslide that sent a churning flood, boulders and mud through a housing subdivision after it poured on July 20, 2010.

It's a rare effort to enlist local property taxes to fix watershed threats in a national forest, and one small turnabout for a region where politicians routinely blast the federal government for mismanaging nature.

In Flagstaff, blame was less important than reality. Each year, city wildland fire management Officer Paul Summerfelt waits nervously to see if the slopes above town ignite. South of town, water managers fear a fire could portend a flood that would fill their reservoir and gum up a plant treating half of the city's supply.

"How long do you want to roll those dice?" Summerfelt said.

Read more: <http://www.azcentral.com/travel/articles/20121217flagstaff-bonds-target-flood-threat.html>

[Top of the Document](#)

REPORT: CLIMATE CHANGING WATERSHEDS

By Brandon Loomis

The Republic | azcentral.com

Tue Dec 18, 2012 10:14 PM

Recent monster forest fires hint at what's ahead in a changing climate, and land managers will have to adapt to preserve functioning watersheds. That's the conclusion of scientists who wrote about threats to ecosystems in an upcoming national assessment of climate change.

The team, led by an Arizona State University life-sciences professor, found that shifts in temperature, moisture and species ranges will have profound effects on human activities, from commercial fishing to storm preparedness.

"U.S. ecosystems are undergoing massive change due to climate change," said Nancy Grimm, a senior scientist with ASU's Global Institute of Sustainability.

Grimm collaborated with officials from the National Wildlife Federation, U.S. Geological Survey and others on a technical report contributing to the ecological segment of the Third U.S. National Climate Assessment, due for release this winter. It's a four-year report ordered by Congress.

In the Southwest, they said, foresters may have to replant devastated forests with drought-resistant trees. In the Rocky Mountains, threatened fishes such as the cutthroat trout will be pushed to the brink.

The report notes that more than 694,000 acres of forest burned in Arizona and New Mexico during 2011. The ash and dirt that washed into the Rio Grande, the source of half of Albuquerque's water, clogged treatment plants and reduced withdrawals for months.

Read more: <http://www.azcentral.com/news/articles/20121218climate-changing-watersheds-report.html>

[Top of the Document](#)

CLIMATE CHANGE ALREADY PLAYING OUT IN WEST, REPORT SAYS

Change 'more dramatic' in winter than previously thought, ecologist says

By [Amy Joi O'Donoghue](#), *Deseret News*

Published: Tuesday, Dec. 18 2012 6:10 p.m. MST

SALT LAKE CITY — A new report says the effects of climate change are already being felt in bug-infested forests of the Intermountain West, in reduced flows of the Colorado River basin and in the amount of snow that falls in the Rocky Mountains.

What is key, the report stresses, is how state and federal governments are responding and what land and natural resource conservation strategies can be embraced or expanded to counter the impacts.

"I think the bottom line is that these impacts are not going to happen 50 or 100 years from now," said Bruce Stein, director of climate change adaptation with the National Wildlife Federation. "Many of them are already here, and we are going to have to be rethinking what we do to protect our wildlife and how we build and protect our communities."

In addition to climate changes causing heat waves in the summer, the report highlights a surprise revelation that its biggest effect occurs in the winter months. Those warmer winters are enhancing pest outbreaks and accelerating the melting of snowpack each year, reducing the amount of water that's available later when needed.

The report, *Impacts of Climate Change on Biodiversity, Ecosystems and Ecosystem Services*, was peer-reviewed by the U.S. Geological Survey and drew on the expertise of 60 contributors from government agencies, universities and private, non-profit organizations such as The Nature Conservancy.

Read more: <http://www.deseretnews.com/article/865569065/Climate-change-already-playing-out-in-West-report-says.html>

[Top of the Document](#)

HOW DID GRAND CANYON FORM? FLOOD DIDN'T CARVE GIANT GORGE, GEOLOGIST SAYS



By [Becky Oskin](#), *OurAmazingPlanet* Staff Writer

Published: 12/18/2012 03:20 PM EST on *OurAmazingPlanet*

Could the origins of the Grand Canyon lie in an enormous flood?

The answer is no, says geologist Bill Dickinson, an emeritus professor of geology at the University of Arizona in Tucson.

Tracing the history of the Grand Canyon is controversial. The deep gorge exposes a billion years of Earth history in its candy-colored cliffs, but [geologists can't agree when it formed](#), or exactly how.

Dickinson hopes at least to lay to rest one hypothesis: That an ancient lake carved the canyon through a cascading series of waterfalls. A favored concept for two decades, "I don't think it's a valid story, and my main purpose is to dismantle it," Dickinson said of his new study, published Dec. 13 in the journal *Geosphere*.

Here's the gist of the idea: A giant lake covering eastern Arizona ate through a limestone ridge called the Kaibab uplift, near the eastern end of the present-day Grand Canyon. A torrent of water spilled through the crack, [cutting the canyon](#) we see today. The Colorado River then followed the new course that was set.

Read more: http://www.huffingtonpost.com/2012/12/18/how-did-grand-canyon-form-flood_n_2325038.html

[Top of the Document](#)

NONPROFIT TECH INNOVATORS INSPIRE NEW PHILANTHROPY

By BRETT ZONGKER

Associated Press | Thu Dec 27, 2012 6:10 AM

WASHINGTON -- Scott Harrison knows his charity has funded nearly 7,000 clean water projects in some of the poorest areas of the world in the past six years. How many of those wells are still flowing with drinking water months or years later, though? That's a tough question to answer.

His organization called Charity: Water has funded projects in 20 different countries. It's committed to spend 100 percent of each donation in the field to help reach some of the 800 million people who don't have clean water and resort to drinking from swamps, unhealthy ponds or polluted rivers. Organizers send donors photos and GPS coordinates for each water project they pay for.

Still, Harrison, a former New York promoter for nightclubs and fashion events, didn't want to guess at how many water projects were actually working. He wanted to give donors more assurance, knowing as many as a third of hand pumps built by various governments or groups stop functioning later. His solution: why not create sensors to monitor the water flow at each well? But raising millions for a new innovation could prove impossible.

Few funders want to pay for a nonprofit's technical infrastructure or take the risk of funding a dreamy idea. They'd rather pay for real work on the ground.

Read more: <http://www.azcentral.com/business/news/free/20121227nonprofit-tech-innovators-inspire-new-philanthropy.html>

[Top of the Document](#)

JOB POSTINGS

Find these and other positions posted on the [AHS jobs board](#):

- [Staff or Senior Staff Geologist/Engineer - Terranext, LLC](#)
- [HYDROLOGIST 4 - ADWR](#)
- [Engineer/Geologist/Scientist - Haley & Aldrich](#)

[Top of the Document](#)

ADDITIONAL INFORMATION

For more information about the Arizona Hydrological Society, or to view current job listings and announcements, please visit our regularly updated web site at:

<http://www.azhydrosoc.org/>

Membership may be renewed by credit card through the AHS website or by mailing a check to the Arizona Hydrological Society, P.O. Box 1882, Higley, AZ 85236. Dues remain at \$45.00 year for regular membership and \$15.00 for students. Please remember that your 2011 membership was included in the 2010 Symposium registration fee!