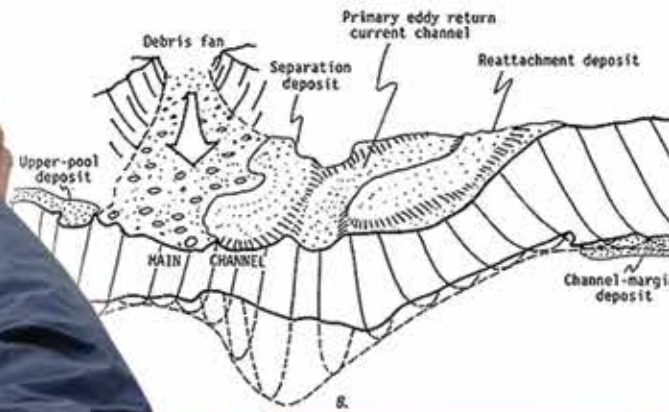


# boatman's quarterly review

## JACK SCHMIDT



Prez Blurb • Farewell • Dear Eddy • Escalade Opposition • Mapping Site  
Remembrance • GCPA • Wild and Scenic • Books • Back of the Boat  
Long-term Change • Vision • Canyon, Time and Silence • Monsoon • Our Immune System



## boatman's quarterly review

...is published more or less quarterly  
by and for GRAND CANYON RIVER GUIDES.

GRAND CANYON RIVER GUIDES  
is a nonprofit organization dedicated to

*Protecting Grand Canyon  
Setting the highest standards for the river profession  
Celebrating the unique spirit of the river community  
Providing the best possible river experience*

General Meetings are held each Spring and Fall. Our Board of Directors meetings are generally held the first Wednesday of each month. All innocent bystanders are urged to attend. Call for details.

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Our editorial policy, such as it is: provide an open forum. We need articles, poetry, stories, drawings, photos, opinions, suggestions, gripes, comics, etc. Opinions expressed are not necessarily those of Grand Canyon River Guides, Inc.

Written submissions should be less than 1500 words and, if possible, be sent on a CD or emailed to GCRG. Microsoft Word files are best but we can translate most programs. Include postpaid return envelope if you want your disk or submission returned.

Deadlines for submissions are the 1ST of February, May, August and November. Thanks!  
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## Prez Blurb

SINCE THIS IS THE FIRST TIME I have written a letter as president of Grand Canyon River Guides, I would like to introduce myself. My name is Latimer Smith and I live in Kanab with my wife Megan and son, Reed. I was very fortunate as a youngster to run several trips through Grand Canyon with my parents and Grand Canyon Expeditions. When I decided to become a guide, I started working for Colorado River and Trail, mostly in Utah, then mainly in Grand Canyon. For a number of off-seasons I repaired boats at Western in Fredonia. A few winters ago, I moved into a year-round position at Western. Now, I guide half-seasons and work in the office and adjoining warehouse when I'm not on the river. During the fall and winter, I continue to refurbish and repaint our J-Rig fleet.

The late Bill Bowker introduced me to GCRG and I will always be grateful that he did. He and I arrived at Hatch together for a GTS on a windy and chilly full-moon night in 2005. I was taken by Bill's passion and enthusiasm for the canyon and the river community. I was also inspired and impressed by the land session speakers and their abilities to pass along knowledge. I was a participant on the GTS river trip that year as well. The highlights for me were hiking such places as Eminence Fault to the rim and scampering up Vishnu Creek. I also forged meaningful and lasting friendships with several other guides and speakers on that trip. I greatly appreciate that Walker Mackay originally nominated me to the GCRG leadership in 2008. I have been involved as a board member or officer each yearly cycle minus one since then. I am also very thankful to have the Mackay family (CRATE) and Trent Keller (WRE) in my life as past and current employers who have been and continue to be great supporters of me and my endeavors at GCRG.

Many issues continue to keep us engaged. I'll begin with the Fall Rendezvous which sadly did not materialize this year due to lack of interest. Undoubtedly, fall is a transitional time for guides who often, after a long season, have moved on to different employment and other activities. It's clear that this year, regardless of our exciting plans to enjoy the North Rim together, we did not get the word out to our members soon enough as to the details of the gathering. To mitigate future rendezvous cancellations and gather more interest in the event, we are currently looking to isolate a weekend in early October to use year after year. That way

Cover images of the 45,000 cfs flood flow. Above the ledge hole @ Lava Falls / Susan Hamilton photo. Jack Schmidt pointing and Glen Canyon Dam release / USGS photos.

guides and members who want to participate will be able to arrange their schedules accordingly. The Fall Rendezvous is intended to be an active learning experience, and at the same time be a chance for reflection and decompression. Please consider attending the Fall Rendezvous in 2013; others along with me will keep you informed on future plans.

Lately, we have been looking for ways to increase guide membership in addition to general membership. Possibly one of the most basic and effective tools at every guide's disposal is to connect our guests to GCRG by passing out copies of the *Boatman's Quarterly Review* to them on trips. With the BQR now available in color, our publication is looking better than ever. Coupled with a short verbal explanation of GCRG's mission and niche in the river community, simply handing a guest a current or past edition of the BQR is always a great gesture. Without question, the fact that we produce such a high quality publication keeps thousands of people attached to Grand Canyon. The BQR is also fantastic because it provides an open forum for anyone who's interested to produce a submission. The potential for new members is enormous, especially if each of us makes a commitment to spread the word about GCRG. Lynn Hamilton has plenty of past BQR issues available for us to pass out to river guests and fellow guides alike.

During late August next to the river at the Paria Beach downstream from Lees Ferry, Jack Schmidt and the Grand Canyon Monitoring and Research Center hosted an evening including dinner, prepared by Simone and Tim Stephenson. Lynn and I were there, along with a handful of current and past GCRG board members. The gathering took place after the semi-annual Glen Canyon Dam Adaptive Management Work Group (AMWG) meeting held in Flagstaff. After the meeting, the AMWG representatives met us at the beach as dinner was nearing completion. These folks represent the upper and lower basin states, the water and power industry, various government organizations, local Native American tribes, and numerous concerned non-profit organizations. The gathering showcased a sample of what it is like to experience a river trip as many of these people have never seen Grand Canyon through the eyes of a river runner. After heavy monsoon rains, the Paria was pumping plentiful amounts of muddy water into the mainstem reminding us that the Colorado River system is ever changing. The consensus from us at GCRG is that the event was a huge success as most participants hung out and talked around the fire, sharing information and enjoying each other's company long after the river kitchen was taken down and hauled away. My hope is that as individuals and as an organization we continue to voice our concerns in regards to the management of

Glen Canyon Dam as the Long Term Experimental and Management Plan (LTEMP) comes back into focus and the draft EIS begins to emerge this coming spring.

Grand Canyon Wildlands Council and other organizations have proposed setting aside 1.7 million acres of land for national monument designation. The proposal divides these lands into five separate areas: the Kaibab Plateau, House Rock Valley, the Kanab Creek Watershed, the Kaibab-Paunsagunt Wildlife Corridor, and the South Rim Headwaters, tied together as one Grand Canyon Watershed National Monument (see article on page 31). The official proposal is available online and brings clarity to the importance of further protecting these public lands. I personally support this proposal for many reasons, and I think it wise for us as an organization to get behind it as well. As an example, it bolsters the recent twenty-year ban on new hard rock mineral leasing and on mining existing claims which lack valid rights. GCRG supported this twenty-year moratorium, and in addition, designation would greatly protect untrammeled landscapes, wildlife resources, and the Colorado River water quality permanently. Monument designation also marries well with our opening mission statement: protecting Grand Canyon. Grand Canyon Wildlands Council is currently seeking our support.

This past season's closure of the Deer Creek Narrows will likely re-surface during the park's preliminary procedures for their upcoming Backcountry Management Plan. Interested and concerned people and parties will be allowed to provide input. This closure ignited many spirited discussions that ran the gamut amongst past and present board members. Many feel the closure was overreaching and unnecessary. Originally I felt this way too. However, over the days and weeks following the Superintendent's decision, I began to view it as a just and reasonable closure. For many years the Southern Paiute Tribe has asked that we empathize with their heritage and spiritual world view by refraining from climbing and rappelling into the narrows. This apparently was either unknown to or not fully appreciated by many visitors to Deer Creek. The narrows are clearly a Traditional Cultural Property (TCP) of paramount importance to the tribe. My view is we should recognize that the vast majority of the Deer Creek drainage is available to us and stand behind this closure for the strength it provides to the Southern Paiute Tribe and for us as stewards of the canyon.

The LCR confluence gondola and related developments continue as looming threats to Grand Canyon and to the river experience. Make no mistake that without the efforts of people such as Lynn, Nikki Cooley and Roger Clark, we would be much less informed

and in a potentially diminished position to counteract the push for this development. I am wholeheartedly supportive of the views and arguments that our above mentioned friends have concisely expressed in words and in writing in relation to this issue. Please stay tuned in by reading the BQR and watching for related GCRG emails as these sources will continue to keep us apprised.

To finish up, I would like to express that our greatest strength lies within our diversity. We have a marvelous place to go to work, and also a canyon to call home. Depending on how you look at it, thirteen to sixteen river companies operate as concessionaires in Grand Canyon National Park, each with their own style and traditions, and their own guide culture. I have run with many boatmen from various companies and found that nearly all are people I could count on in a tight

spot. We are an incredibly fortunate bunch to be able to rely on each other on and off the river. I suggest we continue to have open dialogue concerning all issues and try as best we can to coalesce on what is most important. Despite our efforts, sometimes we may have to agree to disagree with respect for one another. I have expressed my own personal view on several subjects in this letter. I may be the current GCRG president, but I am simply a member of this organization first and foremost. My priority is to inform our membership and I would be grateful to hear some feedback. I am reachable by email at [latimersmith@hotmail.com](mailto:latimersmith@hotmail.com) or by phone at 435-757-5921. I hope to see everyone in person at the GTS next spring; I would love to meet and get to know you if we haven't yet!

*Latimer Smith*

## Farewell

NATHAN CARRINGTON AVERY  
MARCH 10, 1967–AUGUST 18, 2012

NATE AVERY PASSED AWAY in a freak accidental fall at Lake Powell on August 18, 2012. He was 45. Nate was a neurosurgeon in Flagstaff, Arizona, but his heart resided with his family and in the wild places of Northern Arizona.



Nate came to work for Hatch River Expeditions in the summer of 1988, a young college kid who wore a cowboy hat, frequently had a chew in his lip, and drank his fair share of beer. He fit right in.

Nate spent several summers on the river working as a swamper, enamoring clients with his easy going charm and good natured wit. He spent his winters in medical school at the University of Arizona, while simultaneously trying to win the affections of a certain Arizona River Runners (ARR) guide, Annette Wildes. He graduated from medical school in 1994, and successfully made Annette his wife. Unfortunately, Nate had to give up his incredibly lucrative career as a Hatch swamper when he moved to Kentucky for his residency.

Nate and his brothers and sister grew up in Flagstaff, and the surrounding areas were their playground. Nate was happiest in the far reaches of Northern Arizona, whether hiking Coyote Buttes, boating on Lake Powell, or running the river. As long as he was outside, doing what he loved, he would fondly say, "This is the best day ever."

You can take the boy out of Arizona, but you can't take Arizona out of the boy. Nate returned to Flagstaff to practice neurosurgery in 2000. The homecoming brought him back to the places he loved. He hadn't spent much time on the river since moving to Kentucky, aside from a short hike in via the Tanner Trail to catch up with a Hatch trip, a four-months pregnant Annette by his side. Nate's responsibilities as the only



pediatric neurosurgeon in Flagstaff were huge, however, he took every opportunity to be outside, even going so far as to keep a boat on Lake Powell so that when he was in Page for clinics he could sleep on the lake rather than in a hotel. He took advantage of every private trip offering, sharing a boat with Annette, and recharging his soul with friends on the river.

If you knew Nate, you knew he was just a regular guy. There were no pretenses with Nate. Even though he could have hung his hat on the fact that he was, in fact, a brain surgeon, (and a damn good one by his colleagues accounts) he never did. In fact, Nate had a way of making you feel like *you* were the most important person in a room. He was generous and kind, and believed strongly in giving back to the community. At one of the Whale Foundation's annual Wing Ding events he even donated a brain or back surgery to the highest bidder, musing aloud that in a room full of working river guides, several were bound to need his services at some point.

Nate's death has had a profound impact on the community of Flagstaff, and understandably, even more so on the people who loved him. Words seem inadequate to those who knew him well. Words can tell the events of his life, but they can't replicate the



gift Nate had for making people feel at ease. He was a doctor, and yes, he saved lives. But he also changed them. He had an unassuming air, so when you talked with him you felt at the time it was just an everyday conversation, but yet days later, you would look back and realize that this man had really *said something*. That's how it was with Nate.

Nate lived a full life, and even though it was much too short, it was fantastic. He did what he wanted, and generously took those around him along for the ride. Those who had the pleasure of spending time with him on the river, hiking, or on the lake were given the incredible gift of his love and friendship. And coming from Nate, it was an incredible gift to have received. At Nate's Celebration Of Life, Annette stood up in front of the gathering of some 1500 people and said, "I think that if Nate were here today...he would no doubt say, 'This has been the Best Life Ever. The Best!'"

Nate leaves behind his loving wife Annette, his three beautiful children, Cora, Thad, and Maddie, brothers Thad and Chris Avery, and sister Maureen Avery Meyer, as well as a whole community of friends who miss him dearly. To read more about Nate and the hundreds of lives he touched, visit the website [www.nateavery.info](http://www.nateavery.info). The website is graced with story after story that just begins to touch the surface of the life of this amazing man.

Sarah Hatch



Nate and Billy Ellwanger at Hatchland sometime around 1990.

## Dear Eddy

IN RESPONSE TO A “*Dear Eddy*” WRITTEN BY GEORGE RHEE,  
IN THE FALL 2012 BQR, VOLUME 25:3

THIS MORNING I WAS reading George Rhee’s response to a book review written by Rob Elliott published in the latest BQR. As a geologist (Arizona Certificate #51408), I feel compelled to address certain aspects of this letter. Mr. Rhee is correct that human activity for the past six million years has increased the amount of carbon dioxide and other “greenhouse gasses” in the Earth’s atmosphere. But he is wrong that there is a “silver bullet” to stop the so-called “Climate Change.”

In fact, what we call “Climate Change” is a process that has been continuously occurring throughout Earth’s history. What better place to experience this climate change than a trip down the Colorado River through the Grand Canyon—from the Kaibab Limestone (deposited in a warm climate in a shallow restricted shallow sea embayment such as today’s Persian Gulf) through the igneous and/or sedimentary processes that represents the rock basis for the metamorphosed Vishnu Basement Rocks that could have had their beginnings during the time period before the Earth had an oxygen atmosphere. (Note the Vishnu Basement Rocks includes the Vishnu, Rama, and Brahma Schists and Elves Chasm Gneiss.) Though the rocks tell us of different deposition environments, igneous and possibly different metamorphic processes, the rocks all speak of climate change.

Though Mr. Rhee may like to collectively point at Mr. Elliott and others, including me, and label us as “apologists for the oil companies,” I believe he misinforms the public into believing that “Climate Change” is only caused by human’s greenhouse gas emissions. His further assertion that “the apologists” are saying “the situation is hopeless” is again false. The “Climate Change” and “the situation” Mr. Rhee is referencing are continuing processes of the Earth. One only has to research the paleoclimate to realize that in past times, long before the appearance of early humans, that the Earth was much warmer and much cooler than the current (changing) climate. In fact, one can infer from geological data that the Earth’s average temperature during the deposition of the Tapeats through the Surprise Canyon Formations was much warmer than present day. In fact, it is possible that the Earth’s average temperature was as much as 8°C warmer than present day during the deposition of the Tapeats Sandstone! It appears that the Earth had another warm

cycle at the time of the Kaibab Limestone deposition during Permian Period. In fact, it is interesting to note that at the end of the Permian Period (and Kaibab deposition), there are indications that the Earth’s oceans warmed from the surface to the deepest depths and “overturned” and released dangerous hydrogen sulfide gas trapped in deep ocean sediments. Some geologists believe this was the cause of “The Great Dying” at the end of the Permian Period—one of the most devastating extinction events in Earth’s history! And it was a much warmer Earth Climate at that time when compared to present day!

The answer is not to say that the “situation is hopeless,” but to say that the constant changing climate of the Earth is normal. Mr. Rhee is correct in that human activity and production of greenhouse gasses are exacerbating the warming trend of Earth’s climate. I agree with him that humans need to find ways to minimize our influence on the Earth’s natural processes. However, investing \$14 trillion will not stop climate change any more than it will stop the Earth’s plate tectonics (a huge contributor to climate change). Humans do need to take heed from Earth’s history lessons. As Dr. Robert Bakker proposes in his book *The Dinosaur Heresies*, the Cretaceous herbivores were so efficient in their grazing, millions of tons of methane gas (a greenhouse gas) were released into the atmosphere. This methane exacerbated an Earth’s warming trend and possibly placed a stress on their environment that contributed to their final demise—at least for the larger dinosaur species.

This could be an example of why we should learn from our Ancient People and try to live with the land rather upon it. It is a lesson taught by every boatman that guides a group down the river—while a guest of the Canyon, to be with the Canyon. Take only pictures and leave only footprints.

Mr. Rhee is correct again in that the guiding community has a responsibility to be honest and truthful. The guiding community is in one of the Earth’s best classrooms to show and educate their guests about climate change and the Earth’s processes. As James Hutton stated, “The present is key to the past,” and the past is key to the future. We can learn that the constant is actually change—it is there in every mile of the Canyon. Yes, we do still need fossil fuels. Yes, we do need to control our emissions (such as better scrubbers on the coal power plants to clear the Canyon air!) for today and the future. And, yes, we do need to develop alternative energy sources. The fact is—the Earth is



changing. We must also change. The consequences of not changing (or adapting) are severe and shown repeatedly in Earth's geologic record—both inside the Canyon and out.

Ron Nichols

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IN RESPONSE TO THE CLOSURE OF THE DEER CREEK NARROWS AND PAST ARTICLES IN BQRS AND DISCUSSIONS IN THE RIVER COMMUNITY.

I HAVE HEARD A LOT of discussion about the closing of the Deer Creek Narrows from many in the river community. A lot of people are angered by the fact that we were not given a chance to have any input in the process before the decision was made, and many I've talked to are angered about the decision itself. I may not agree with how the closure was accomplished, but I think this is a good thing for us as a community of private and commercial boaters to support, regardless of how it came about.

To the Southern Paiute, the Deer Creek Narrows are the entrance to their underworld—their “Heaven's gate,” as it were. Souls make their way down from the rim and along the edge of the Narrows until they are met by the spirit that will lead them down and across and into the next world. In the Southern Paiute cosmology, there is no more sacred and important place, because what happens here determines not only what happens to an individual soul, but also to their entire world. For the Southern Paiute, “Heaven” and the everyday world are inextricably linked, and each mirrors the other.

Recently, many of the elders of the Paiute tribe have worried that the imbalances and unhealthiness of their tribe in the everyday world are a reflection of the visitation occurring in the Narrows. Perhaps not all of the Paiute agree on this, certainly some of the younger members of the tribe don't necessarily hold to the old ways, but many do. They would like us to stop going down into the Narrows and disturbing the place.

*So what? We say. We're not disturbing anything. We don't hurt any physical resource like we would at the Salt Mines or other off-limits places. Flash floods would wash away any physical trace of us if we left one.* This is where I think we need to step up to the plate and understand that it may not be a physical resource that we are hurting, but a metaphysical one. Just because

we can't see or understand it that way doesn't mean that we shouldn't respect it as such for another people. We may not have a place as sacred in our cosmology, but try and imagine one: the Wailing Wall? Mecca? The Vatican? Yes, all those are physical resources that would be hurt by people climbing all over them, but it's more than that. We don't scream and laugh and giggle, no matter how well intentioned, in a church because it just isn't appropriate.

*But isn't this some sort of religious thing that's infringing on our rights?* I personally don't see it this way. To the native peoples of this region, everyday life and religion are not two separate things. This isn't about them “imposing” their religious beliefs on us. It's about them asking us to respect their sacred places and do one small thing to help bring balance back to their world.

*What about how sacred this place is to us and to our passengers? Isn't that as important as the fact that it's sacred to them?* “Special” and “Sacred” are two different things. Our relationship with this canyon goes back thirty, forty, fifty years, and it has always been one of fun and joy and laughter and exploration, community, education and special-ness—all very important things. But their relationship with this place is one that goes far deeper, spiritually, and has lasted much longer. Furthermore, it may be critical to the emotional and physical health of their tribe.

*But this is the absolute best thing that I do with my passengers on the whole river trip. Why do they have to be denied this?* Climbing into the Narrows is certainly one highlight of a river trip. When I used to take people down in there, they loved it, they had a blast and they talked about it for a couple days. But at the end of the trip, that wasn't what they mentioned as a highlight. They talked about the canyon as a whole, a particularly gorgeous storm, the community, the rapids, the food. When I stopped taking people there about eight or nine years ago, my trips didn't suffer one bit. If I am basing my guests' experience of the canyon on visiting one place, I am missing the point of a Grand Canyon trip. These days my guests love to hear about how important Deer Creek is to the Southern Paiute, and they still have a blast on the Patio, playing in the waterfalls, and going up to the Source.

*Next they'll be wanting to close the whole Deer Creek area, and what about other places in the canyon?* I am not worried about this. I spoke with Charlie Bullets from the Southern Paiute Consortium about this very question, and he was very clear that they would never

ask that. While the whole place is special to the Paiute people, it is the Narrows that are the most important, and the most sacred. Visitors to the Patio and the Source do not disrupt the balance of their world. Visitors into the Narrows do. As for the rest of the canyon, or other places in the canyon, I don't think that the tribes who hold these places sacred are lying in wait, hoping to deny us the ability to go there.

But this does bring up an interesting point. We as a community are unified in our opposition to the Grand Canyon Escalade development at the Confluence of the Colorado and the Little Colorado River (LCR). Clearly, this is because it would forever alter the physical character and wilderness quality of the land, perhaps harm endangered fish and leave a horrible, indelible scar on the place. But for the Navajo (and Hopi) families fighting this, it's about how sacred the place is, how important it is to their prayers, and the balance of their lives and their world. Is this any less important than fighting against scars on the land? If we support them in fighting that development for those reasons, how can we not support the Paiute in their desire to see the Narrows closed to visitation for the very same reasons?

What if the Hopi asked us to stop putting our life-jackets on like diapers and swimming the rapids in the LCR? Could we do that, to honor their culture? When I learned a few years ago that it is offensive to many of the elders of the tribe (although they were fine with just swimming near the mouth), I stopped doing that on my trips. I still have people coming back over and over, loving the canyon and reveling in the experience as a whole. I don't miss doing it, and I'm glad for the opportunity to share what I know of another culture with my guests. They, in turn, are happy to be part of honoring another culture's wishes.

We are extraordinarily privileged to be able to spend time on this river. Because of this, I think it is our responsibility to try and understand and honor the beliefs, cultures and needs of the peoples for whom this place is a critical part of their spiritual landscape. It is not enough to just "interpret" their history and details of their lives to our guests. I believe it is also incumbent upon us to be leaders in helping protect the sacred qualities of places that we get to spend an awful lot more time in than do they.

*Christa Sadler*

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IN RESPONSE TO THE CLOSURE OF THE DEER CREEK NARROWS AND PAST ARTICLES IN BQRS AND DISCUSSIONS IN THE RIVER COMMUNITY.

I FIND IT INTERESTING that the last several people commenting against the proposal to allow the Native Americans of Northern Arizona and Southern Utah the courtesy of canyoneers respecting one of their more sacred areas, the argument posed against respecting them rests on three premises, all of which are false:

#### ARGUMENT #1—"MIGHT MAKES RIGHT"

The local tribes of Northern Arizona lost their ancestral lands strictly due to being invaded and gunned down by the U.S. Cavalry backed by U.S. Congress and/or by local whites of many stripes from Arizona and Utah and New Mexico who wanted the Native Americans' lands for ranching, mining, etc. The argument that "Might Makes Right" has shaped the history of the world for as long as any historical (or pre-historian) can tell is posed as if to lend it legitimacy. In short, this argument goes, armed robbery is legitimate, especially if it happened before "I" or "we" was/were on the scene. Clearly, however, armed robbery, murder, and oppression, whether carried out with or without government sanction, remains immoral and unethical. Indeed, Adolph Hitler often claimed that America would not have a moral leg to stand on with regard to his genocide of German (and other) Jews because the USA had practiced repeated and planned genocides against Native Americans throughout its first 125 years as a nation.

Modern American society was built on a foundation of aggressive genocide. I am not wringing my hands in guilt over this. I had nothing to do with it, just as you did not. But it remains a fact. One has only to read the *Definitive Journals of Lewis and Clark* to get a feel for the many thousands of diverse peoples and cultures that lived in western North America 200 years ago. Did they live in harmony? No. Of course not. But they did live and they inhabited America in a pattern of dynamically shifting tribal ownership that lasted for millennia without wiping each other out.

In short, in my opinion, lethal *injustices perpetrated in the past are not legitimized by the passage of time*. What time does do, however, is make those injustices nearly impossible to correct or atone for. The passage of time makes redressing wrongs ever more impractical or impossible. But, again, it does not legitimize them.



More to the point, the surviving Native Americans have every right to express their opinions and desires regarding land use—or misuse—on, or of, their ancestral lands. And they also possess the right to make requests regarding stopping what they perceive to be significant disrespect of their sacred places.

ARGUMENT #2—WE ARE ALL AMERICANS AND WE ALL “OWN” FEDERAL LAND EQUALLY

This is true, but complicated. Consider the legion of riders of quad off-road vehicles who rail against closures of existing forest service roads and restrictions against off-road usage intended to prevent erosion, destruction of vegetation, habitat and so on. They are all Americans, but their perception of what their rights are as Americans differ from those of many of the rest of us. They think they “own” public land just as the rest of us do, but the rest of us dispute that their “ownership” confers unlimited types of usage of that public land. Nearly all Americans agree with this “limited usage” concept as applied to Public Lands, based on the consequences created by misuse.

In short, not every American perceives “use” of Public Lands in the same light of harmless versus harmful. And in a free society those who perceive a harmful use are entitled to discuss and dispute it. This would include Native Americans.

ARGUMENT # 3—AMENDMENT 1 OF THE U.S. CONSTITUTION: “CONGRESS SHALL MAKE NO LAW RESPECTING AN ESTABLISHMENT OF RELIGION, OR PROHIBITING FREE EXERCISE THEREOF” DENIES THE NATIONAL PARK SERVICE (AND THE FEDERAL GOVERNMENT) ANY RIGHT TO RESPECT THE “RELIGION” OR COSMOLOGICAL/SPIRITUAL BELIEFS OF NATIVE AMERICANS (YES, THERE EXISTS A VAST DIFFERENT BETWEEN SPIRITUALITY AND RELIGION)

The reality of the First Amendment based on the test of time since it was ratified in 1789 has not been that Congress has passed no laws regarding religion. There have been several laws passed. Amendment 1, however, does continue to embody the preferred freedoms necessary for a functioning of a free society. To this effect, the spirit of the First Amendment is to prevent Congress from creating a state religion or by giving material support to specific religions. It also prohibits the government from interfering or infringing on what people believe in their religion. Indeed the First Amendment protects people’s right to believe. Yet it does not guarantee their right to practice all beliefs.

In fact, the Federal government is very pro-monotheistic, as opposed to pan-theistic. All of our currency reads: “In God We Trust,” not “In Gods We Trust.” Does this offend pantheists? You bet it does. Does it

rankle atheists? Ditto. But it also reveals that the First Amendment does have the power, and has exercised that power many many times, to respect some existing religions, and to do so prejudicially.

The Second Amendment was/is instrumental in exempting clergymen and pacifists from serving in combat units during periods of conscription. *Note that this combat exemption was/is a very serious, life-or-death law written recognizing the absolute respect of a religious and spiritual conviction held in the minds of many Americans that made them exempt from lethal exposure during combat.*

(I was a platoon sergeant in 1967–68 and witnessed this exemption in action.)

In short, the First Amendment incontrovertibly does not prohibit the National Park Service nor the Federal government from passing any rule in respect of the spiritual beliefs of Native Americans, vis a vis Deer Creek Narrows. Such rules already exist, and with no serious challenge for decades, for example, the “no stopping on the left shore of the Colorado” at the Hopi Salt Mine area. Claiming that the Park has no legal precedent to do the same thing at Deer Creek Narrows is baseless, and I also have to say, ignorant.

In conclusion, while I sympathize with everyone who would prefer to keep Deer Creek Narrows open to everyone—and I am one of those people who consider being in the Narrows as one of the most wonderful experiences in the world—there exists no legal impediment to closing it in respect of Native American spiritual beliefs.

And to those who consider such a closure a slippery slope to closing more and more of the Canyon for spiritual beliefs even while some Navajos are (hypocritically) ignoring their own peoples’ spiritual beliefs at the confluence of the Little Colorado to build a pie-in-the-sky tramway as an imagined road to riches, I sympathize even more. The Tramway idea is a load of crap. But it too is probably legal.

On the other hand, I still stick by my original statement that as members of a civilized society soiled by a sordid history of greed and rapacious, violent usurpation of pre-existing societies occupying the land in question, it devolves upon us to extend the courtesy today to the surviving Native Americans of Northern Arizona to not tread on their sacred spiritual beliefs.

All cynicism aside, what sort of being do we want to see when we look in the mirror?

Michael P. Ghiglieri

## Announcements

### LOST

Canon Ixus Camera (9 Mg, I think) metal body in a waterproof housing. Distinguishing feature: right panel of camera case is missing. Lost on October 11 at Tapeats Creek. Contact: Stephen McCormick at 503-544-9128.

### LOST

Paddle lost on August 13<sup>TH</sup> in House Rock Rapid (late in the day around 3:30 P.M.). It is a Werner black graphite paddle. If anyone knows it's whereabouts please get in touch with me and I will get it to it's owner. Contact: hilde@amriver.us.

### NOTICE TO MARINERS

This winter, take a working vacation at a resort destination. Study for your captain's license on a houseboat at Antelope Point Marina on Lake Powell. Course dates are January 7–18, 2013 (weekdays). This all inclusive package covers the course, accommodations on a houseboat for the duration of the instruction and testing, continental breakfasts, and a boxed lunch every day of class. The cost is \$2500 (special rates for locals). There are only twelve seats available, so call now to reserve your seat. Call Captain Janssen today at 360-296-2747

## Correction

**G**RAIN BEFORE GRAPE, of course...My cousin C. V. Abyssus got things a bit mixed up in his "Whitneyisms" in the last *Boatman's Quarterly Review* (Voulme 25:3). Given all that he stated about consuming grain and grape in the least intrusive order, logically it would follow that it is best to imbibe in the grain prior to switching to grape.

C. V. Qbyssus

## Dues Going Up...

**H**EADS UP, EVERYONE, GCRG will be raising our membership dues at the end of this year. The last time we raised them was about a decade ago, so many of you will agree that it's about time! If you wish to renew at the current rates, please do so before December 31<sup>ST</sup>. Of course, the increase is modest and still very affordable. The new membership rates starting in 2013 will be:

- \$40 for one year
- \$175 for five years (a bit of a break off the annual membership price)
- \$350 for lifetime (still the deal of the century...)

We estimate that GCRG's "cost per member" is about \$84 per year, so the new membership dues are still a real deal at less than half that. And, you get so much "bang for your buck," including:

- A high quality, 48-page, full color publication, four times a year.
- An outstanding oral history project, archived at Cline Library for broader public access.
- Publication of the edited interviews in each issue of the BQR.
- Environmental education through a variety of means (BQR, email, well-coordinated events).
- Top-notch guide training (land and river sessions) in the cultural, natural and human history of Grand Canyon and current resource management challenges.
- Programs that directly relate to preserving the recreational resource (such as Adopt-a-Beach and our representation of recreational river running interests within the Glen Canyon Dam Adaptive Management Program).
- Continual advocacy and lobbying to protect Grand Canyon and the Colorado River experience.
- Direct involvement in EIS processes through a united, well-respected "GCRG voice."
- Open dialogue and positive relationships with NPS and other river stakeholders.

Without a doubt, GCRG has the best members any organization could ever ask for—passionate advocates for the place we all love and caring stewards of the river experience. Thank you for your support of our efforts and your belief in GCRG!

Lynn Hamilton



## Navajo Opposition to Escalade Escalates

AS REPORTED IN THE last issue of BQR (Volume 25:3), a Scottsdale developer wants to build an aerial tramway into the Grand Canyon. It would begin on the rim at a high-end resort located on Navajo land and transport tourists down to the confluence of the Little Colorado and Colorado rivers.

To pitch his plan, the developer enlisted a former Navajo Nation president, who left office in disgrace but who was able to translate promises of prosperity to local residents in their native language. They claimed that the “Grand Canyon Escalade” project would create 2,000 jobs, bring in billions of dollars to the Navajo Nation, and pave roads and provide running water, electricity, and other services to the region.

However, the decision on whether to approve the proposal is being bitterly contested within the Navajo Nation. Following two votes against the development by the Bodaway/Gap Chapter, project proponents prevailed in early October to gain approval by a seven-vote margin. During the heated town-hall style meeting, opponents claim that police were used to quell debate and exclude participation by community members whose home site leases and grazing rights would be displaced by the development. They have filed charges with Navajo election authorities to challenge the vote and against chapter officials who they say predetermined its outcome.

The well-financed development partners signed an agreement last February with Navajo President Ben Shelly to work together toward planning and swiftly approving the Escalade proposal. Their plan was to secure strong approval by the Navajo Nation that they knew would be needed to overcome subsequent public opposition and legal challenges. They hired Navajo

consultants to promote Escalade’s economic development opportunities, to persuade elected officials, and to unite popular support through “educational” meetings at Chapter houses. They also launched a negative publicity campaign to criticize the National Park Service, river runners, and other groups for profiting from Grand Canyon tourism without benefitting Navajo people or protecting their sacred places.

But the promoters’ plans have not quite panned out as intended. Tactics used to strong-arm the divisive Chapter vote have ignited widespread opposition against the developers, even among those who avidly support economic development in the region. The small band of family members that comprised the original *Save the Confluence* opposition group has added many new allies in forming the *Protect the Confluence Coalition*. Milton Bluehouse, a highly respected former president of the Navajo Nation, joined coalition members on their float during the parade for the annual Western Navajo Fair in Tuba City. Thousands cheered as the float passed, making it clear that opposition to Escalade is escalating.

President Shelly has stated publicly that he will cancel the February agreement by the end of the year if Escalade developers fail to demonstrate a solid consensus among Navajo community members. *Protect the Confluence* advocates have enlisted attorneys, consultants, and traditional leaders in launching their own campaign to ensure that the Navajo Nation Council is firmly opposed to the project. Stay tuned to the latest information by visiting <http://savetheconfluence.com/>.

Roger Clark

## Cool New Web Mapping Site

THE GRAND CANYON Monitoring and Research Center is proud to announce the release of a new, interactive web mapping application on its public website. This new site allows the user to explore some of the Center’s canyon-wide data holdings through a custom interface designed to look at changes in the Colorado River Ecosystem (CRE) between Glen Canyon Dam and Lake Mead. Unique features of the new mapping site include an integrated layer manager and map legend, scale-dependent map annotations such as river mileage, and the ability

to toggle between multiple dates of high-resolution digital imagery (Color Infrared and True Color) for the CRE. Perhaps the most exciting aspect is the ability to interactively view thousands of site photographs spanning decades for both monitored campsites and sandbar study sites along the Colorado River. Please visit the site at the following URL:

<http://www.gcmrc.gov/gis/silvermap1.aspx>

Tom Gushue

## Remembrance Of Things Past

THE FINE ORAL HISTORY ARTICLE by Richard Quararoli about Loie Belknap Evans in the last BQR (Volume 25:3) reminded me of my interactions with Loie's parents, Bill and Fran Belknap, and of other events that happened so long ago.

In the early 1960s I was doing the geologic field work for my PhD thesis in the upper Lake Mead area, centered around Pearce Ferry but extending a long ways north and south in the Grand Wash trough and Hualapai Valley.

In 1962, before starting the thesis work, I was the summer assistant to Bill Breed at the Museum of Northern Arizona. This job eventually led to the field work at the mouth of the Grand Canyon. It also led to a boat trip up into the western Grand Canyon. I do not remember how this trip came about—it may have been arranged by Bill Belknap somehow. Bill was not aboard, but I believe Doc Marston was. I did not know anything about Doc at the time, so his presence did not impress me particularly. What did impress me was the return trip to Temple Bar in the dark of night. In those days, Lake Mead was full of large floating snags that came down the pre-Glen Canyon Dam Colorado River whenever there was a flood. This made it impossible to travel at any speed, and all of us on the boat peered into the murk, trying to determine whether the even darker blob ahead was one of the deadly snags. The mouth of Grand Wash Bay was blocked entirely by a huge log jam.

I started field work in 1963. It is worth recalling how different things were then than they are now. In those days, the area west of the Grand Wash Cliffs was so empty of people that it might as well have been on the Moon. Lake Powell was being filled, so the level of Lake Mead dropped drastically, much as it has today. At Pearce Ferry, there was no lake, and the river was cutting down vigorously into the deltaic muds it had deposited at the head of Lake Mead when the lake level was high. So, instead of water there were mudflats which, so far as I can remember, had no tamarisks. The mudflats were dotted by residual ponds.

There was no lake access at Perce Ferry, nor was there anywhere else from the Meadview area because the Sandy Cove road did not exist yet. Consequently, very few people travelled the long dirt road to Meadview, which was as good as deserted. In any case, Meadview consisted of tracks scraped into the dirt in a grid pattern, and very few buildings. The absence of people was viewed most favorably by the wildlife. The song of coyotes could be heard frequently against the

backdrop of profoundest silence, as were the cluckings of water birds that thickly populated the ponds.

Much of the time I worked with an assistant, but from time to time my geologist wife (we were not married then) would come out for a few weeks. We were cutting our geologic teeth then, so exploring that fascinating area, with the mouth of the Grand Canyon looming not far away, was exhilarating indeed. We got to know a great couple from Prescott who had built a lovely stone house at the edge of Grapevine Mesa, with a fantastic view of Lake Mead to the west. Unfortunately, the Park Service later caused the house to be demolished because it was visible from Lake Mead and (I suspect) may have been on Park Service land. The couple also had a '30s vintage travel trailer on their land, which they let us use. Trailers of that time had a rather nautical flavor and were very small, but this one was snug and cozy in our eyes. The view of the imposing Grand Wash Cliffs at sunset was breathtaking, especially in those days when Los Angeles, Las Vegas, and power plants had not yet extended their smoggy tentacles that far.

These were the glorious aspects of that life, but there were downsides too, notably the lack of real facilities for washing ones self and the primitive meals we concocted upon returning to camp, exhausted after a hard day of fieldwork. So it was always with great pleasure that we visited Bill and Fran Belknap at their Boulder City house, which had a grand view of Lake Mead. Boulder City was a quiet and pleasant little place at that time, and the Belknap's hospitality was always gracious and cheerful, with a near-formal cocktail hour before dinner that featured non-alcoholic beverages. The showers and good food didn't hurt, either. We were not beyond a little sponging.

Bill was always rummaging with his slides, being a professional photojournalist. Some of the time he was going through his photos from when he was in Germany at the end of WWII. What amazed us was how many of the slides he was throwing away. This was long before digital days, and film was expensive to buy and process. We thought he was discarding pictures of great historic value; we had not yet learned the value of pruning, pruning, pruning.

At some point it came out that we were stumped on how to get to certain remote parts of Greggs Basin and Iceberg Canyon, on Lake Mead. We were as poor as church mice and certainly did not have the means to rent or acquire a boat. We had done plenty of rugged walking but that was just too far. It's worth recall-



ing that in those years, there were few motorcycles in the U.S., and certainly no dirt bikes, with the exception of the fairly incompetent Honda Trail 90 and a strange contraption called the Tote Gote. ATV's had not been invented yet, and almost no private individual had any sort of 4WD vehicle. So any kind of overland travel was out.

When he heard this, Bill thought for a minute and then said he had a solution, which was to lend us a Sportyak and a small outboard to go with it. Bill of course was Mr. Sportyak when it came to running rivers, having done, among others, the low-water run through Grand Canyon when Lake Powell was being filled.

The Sportyak is a small tub-like boat made of linear polyethylene, the same stuff used for gallon bottles of bleach and the like. Flotation is molded in. The motor was a British Seagull, developing a whopping 1 1/2 horsepower. Thus equipped, my wife and I set forth at a stately pace toward Iceberg Canyon. The pace was stately because that gnarly motor produced more vibration than forward motion. For its part, the Sportyak was an excellent resonator, much like the body of a cello, so the vibrations were greatly amplified. The results are hilarious in retrospect, but did not seem quite so funny at the time. To begin with, our eyeballs were vibrating vigorously, in keeping with the rest of the body, and we could not see worth a damn. We kept rubbing our eyes in a vain attempt to improve vision, but of course there is nothing that can counteract vibrating eyeballs. The vibration also affected a part of my anatomy that I cannot mention here, causing it to go totally to sleep. It's a sensation that you cannot envision if you have not experienced it. But in the end we got the job done, thanks to Bill.

One of the reasons for visiting the Belknaps was that I also had to study the part of the Grand Wash north of the lake. This required driving all the way around Lake Mead up to Mesquite, which then consisted of a ramshackle gas station and a couple of disintegrating barns. From there, we went on the long deserted dirt road along the Virgin River, through St. Thomas Gap, down into the Grand Wash, and finally to the oasis of Tassi (or Yates) Ranch, at the north end of Grand Wash Bay, built in a grove of large cottonwoods that surrounded the Tassi Spring. This was truly the back o' beyond. Ed Yates, who was still around at the time, let us use one of the stone buildings for cooking and storage, which we did with some apprehension because of the scorpions that were part of the household. We slept in our trusty Volkswagon bus. Ed told us many things, among which were accounts of the gun battles he had in the '30s with horse



Untitled 2

Kimo Nelson

rustlers who considered the Grand Wash the ideal place for their activities.

Sometime after we were there, the Belknaps left Boulder City, so we were fortunate indeed to become acquainted with them at that time. I shall always remember them as intelligent and gracious individuals

who were in love with the country and were more than willing to help young people intent on trying to learn something about it. Thank you, Bill and Fran—I'm sort of mentioning you in my memoirs!

*Ivo Lucchitta*

## Twenty Years Of The Grand Canyon Protection Act

ON OCTOBER 30, 1992 President H.W. Bush signed Public Law 102-575, the Reclamation Project Authorization and Adjustment Act of 1992. The law includes 40 titles, one of which is Title 18, the Grand Canyon Protection Act (GCPA). Today the Grand Canyon Adaptive Management Program is an accepted part of the normal management of the Colorado River in the Grand Canyon. The GCPA was a landscape level shift in the governance of the Colorado River.

Everyone who has worked on the Colorado River as a guide, scientist, or just interested public realize that the 1922 Compact is the cornerstone of Colorado River water law. The laws, treaties, and court decisions, cumulatively the Law of the River, will continue to evolve as the demands of decreasing water supply, increasing demand and the ominous overtones of climate change demand attention. I thought it might help everyone to revisit the path that the GCPA took.

The first thing to remember is that there was a world before EIS's and Biological Opinions. The approval and construction of Glen Canyon Dam all occurred before there was any legal requirement to evaluate the environmental or social impacts of dam construction. The primary focus pre-1969 was developing a positive cost/benefit ratio for the project and the criteria were pretty loose. There was a national desire to develop the West and almost any water project could be economically justified. No environmental review, no evaluation on the impact to the Grand Canyon, no involvement of the Native American tribes, just make sure the Basin states could support the idea and sell it to Congress. Those were the marching orders of the day and Reclamation was the leader of the band.

The damming of Glen Canyon was barely complete when Arizona convinced Congress in 1968 to pump water from the Colorado River to Phoenix and Tucson via the Central Arizona Project (CAP) canals. To fund and power the CAP the original idea was to dam the Colorado twice more—at Bridge Canyon and in Marble Canyon. Eventually the idea of multiple dams in the Grand Canyon was replaced, due to pressure from

the conservation community and the large costs, with the construction of the coal-fired Navajo Generating Station in Page—which has come with its own unique set of problems and challenges. Today the government continues to own over 25 percent of the power plant.

When the turbines of Glen Canyon Dam began spinning in 1963, the goal was to maximize the filling of the reservoir, metering out the water from dam to meet downstream water delivery requirements, and to maximize the generation of hydropower to meet contractual requirements and to pay for the public investment. The conservation community continued to tell Congress that something had to be done about the loss of the resources in the Grand Canyon. Reclamation provided a perfect glide path for these concerns when in 1975 they initiated the uprate and rewind program at Glen Canyon Dam. This program proposed to allow Reclamation to increase the ramping rates and daily flow changes at Glen Canyon Dam, furthering the loss of sediment resources downstream. As Reclamation held meetings on the uprating proposals, they ran into a fire storm of public and legislative concern. Needing to move forward on the generator uprates, the government capitulated. On December 6, 1982 the Glen Canyon Environmental Studies (GCES) program was initiated by then Secretary of the Interior James Watt. Things happened quickly (but not without considerable intrigue), with the high flows in 1983 and 1984 (in excess of 80,000 CFS), with beach surveys, fish studies, and recreation surveys.

In spite of the challenges of starting a research program during the high water years of the early 1980s, the GCES program moved ahead and the National Academy of Sciences (NAS) came on board in 1986. The NAS confirmed what the science was showing—the dam was having large impacts on the downstream environmental and recreation resources. A consensus of scientific, legislative, and public support began to develop. A small, unique, dedicated and passionate collection of scientists focused their efforts on understanding and figuring out if there was a way to better manage Glen Canyon Dam. Three elements emerged.



The first is getting the science right; second is the importance of the building a coalition of support for the program; and lastly the importance of education of the public, including the guides. Without any of these three elements, changing operations at Glen Canyon Dam would not have occurred. It was during the mid-1980s that Steve Carothers and myself put together the first written recommendations to the agencies that they consider a long-range science approach, the precursor to today's Adaptive Management Program.

The result of these initial efforts led in July 1989 to the initiation of the Glen Canyon Dam Operations EIS. The first EIS ever to have been done on the operations of Glen Canyon Dam. It was that decision to do an EIS that required the Department of the Interior to officially include the Tribes, the public, and to take an expanded look at dam operations. For multiple reasons the EIS process took a while to get engaged, not fast enough for those in Congress who were pushing for reform of how the Bureau of Reclamation was doing business in the West.

During the 1980s and 1990s Reclamation was facing Reclamation Reform programs on water allocations, financing, contracting and impacts of irrigation return flows on environmental resources across the West. Some in Congress did not feel Reclamation was "genuine" in

their efforts at Glen Canyon Dam and began a push for legislation to force the timely completion of the EIS and the inclusion of a long term commitment to protect the Grand Canyon. Many of those early discussions occurred not in the offices in Washington, but on the water in Grand Canyon. It took several attempts before the Grand Canyon Protection Act would emerge from Congress and be added to the Omnibus bill in 1992.

The Grand Canyon Protection Act set a new course. It required the EIS to be completed by a set date, taking away the ability for Interior to procrastinate on making a decision. The Act set in place the environment as having a priority in the operations of the dam. Lastly, the Act established the Adaptive Management Program for the operations of Glen Canyon Dam. The resulting 1996 Record of Decision and the Adaptive Management Program may not have not achieved everything, but the intent and the direction is a whole lot better than what was in place before October 30, 1992.

The take home message twenty years after the GCPA is that it would not have been possible without the hard work and efforts of many. Thanks to all of you who made it possible and to those of you who carry on the work today.

*Dave Wegner*

## More River Babies



Hayden Dean Sorensen was born on July 27. He weighed 9 pounds, 3 ounces and was 22.25 inches long. His parents are Joy and Jeff Sorensen.



Reed Dewey Smith was born on October 3RD. He weighed 8 pounds, 15 ounces and was 21 inches long. His parents are Megan and Latimer Smith.



Haven Rose Snyder was born on August 27TH. She weighed 8 pounds, 2 ounces. Her parents are Rachel Rankin and Jacob Snyder.



O'Connor Alan Bringhurst was born on October 17TH. He weighed 8 pounds, 6 ounces and was 20.5 inches long. He was welcomed with love to the family of Adam, Ann-Marie and Natty Bringhurst.

photo by Katie Woodard

## Wild & Scenic Rivers in Grand Canyon. If Not Now, When?

**F**OR THOSE WHO DIRECTLY experience the Grand Canyon, the river and its tributaries come to represent the heart and soul of the place. These waterways are largely responsible for carving the Canyon's magnificent landscape over millions of years and these riparian corridors have evolved into a textbook example of a keystone habitat in that they support an unusually high percentage of the canyon's biological diversity (Barnes 2005, Stevens & Perla 2008). With estimates of

Studies show that more than 90 percent of Arizona's riparian areas are in poor and/or degrading condition due to a century of over-grazing, urban development, groundwater withdrawals, and more (Omart and Anderson 1986, Zaimes et al. 2007). In contrast to this bleak piece of news about the state of Arizona, Grand Canyon's river, streams, seeps, and springs have been largely exempt from these nearly ubiquitous impacts. These waterways and canyons represent the largest



*The Nankoweap Creek Granaries. The Colorado River and its tributaries in Grand Canyon have yet to be honored with Wild and Scenic River designation. Photo by Joel C. Barnes.*

Arizona's remaining healthy riparian habitat being low (Omart and Anderson 1986), Grand Canyon's waterways represent an extensive and relatively intact system of aridland riparian habitat. We also know that these waters have had a formative influence on the cultures that have explored the canyon, from prehistoric hunter-gatherers to hikers and boaters of the new millennium. A living vestige of our Southwest natural and cultural heritage, they are prime candidates for Wild and Scenic River (WSR) designation, which represents the gold standard for river conservation throughout the nation and provides long-term protection for those waterways under its wing).

intact system of nearly pristine riparian areas left in the American Southwest—a living vestige of our bioregional heritage. The Grand Canyon's riparian areas account for only 0.5 percent of the park's total landscape, yet they provide critical habitat to more than 35 percent of the plant and bird species and 80 percent of wildlife species overall (Stevens et al. 1999, Hubbard 1977). These corridors and patches not only function as habitat for biodiversity, they are central regulators of the flow of energy and matter through the region's landscapes and ecosystems. Compared to wetter environs, ecosystem processes in arid landscapes like those of Grand Canyon are more closely tied to the temporal rhythms



and spatial patterns of hydrologic cycles (Sowell 2001). Hydrologic cycles exert an ecological ripple effect on the surrounding landscape that is disproportionate to the scarcity of water. As such, these riparian areas function like a keystone species, but at the habitat and ecosystem levels (Barnes 2005, Stevens & Perla 2008). Grand Canyon's riparian areas provide a compelling case for applying the *keystone* concept at the *habitat and ecosystem* levels to help guide park policy, and this holds merit even considering the views of Soule and Mills (1995) that the concept of a keystone *species* has been applied too simplistically in resource management and conservation. Indeed, in aridland parks like Grand Canyon, riparian areas play a central role in maintaining the ecological integrity of the overall landscape. Unfortunately, even Grand Canyon's springs, seeps, and streams are now threatened, and WSR designation can help save them.

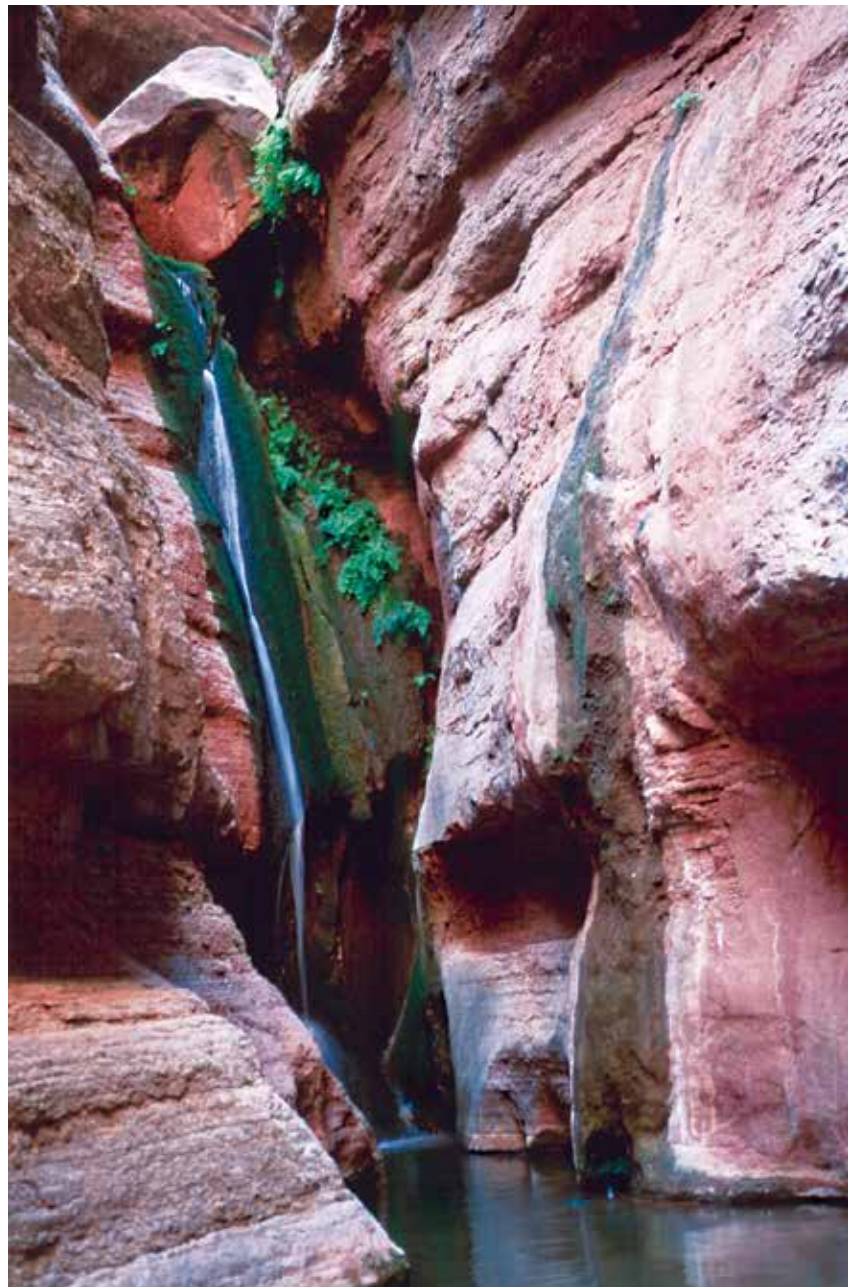
#### SUITABILITY FOR WILD AND SCENIC RIVER DESIGNATION

Managers and conservationists alike cite the fact that the Colorado River and its tributaries, seeps, and springs are already protected by Grand Canyon National Park status as reasonable cause for not pursuing WSR designation. But increasing pressures on our national parks from beyond their political boundaries are very real, as evidenced by the latest resuscitation of a large-scale tourism project in the town of Tusayan—the infamous Canyon Forest Village proposal from the late 1990s (Barnes 1999). If the water required for this development depends on groundwater (which is likely), it will have to be pumped up from the Redwall Muav aquifer. This aquifer underlies the town of Tusayan and the eastern portion of Grand Canyon National Park (GCNP). Most importantly, it feeds some of the tributaries, seeps, and springs of eastern Grand Canyon (Barnes 1999). This is where the importance of WSR designation plays into the stewardship of these resources.

The Wild and Scenic River Act (WSRA) provides the most comprehensive legal protection available for the instream flows of river systems. The WSR designation guarantees that enough water stays in a stream to support the values for which it was designated. The WSRA is potentially as significant to the water resources of parks as the Wilderness Act is to our land resources. Wild and Scenic River designation would maintain and enhance long-term protection for the Colorado River in Grand Canyon, including its tributaries, seeps, and springs—some of which are clearly threatened by activities beyond the park's boundaries.

Over the past three decades, southwestern riparian systems have been identified time and again as an endangered ecosystem of North America (Omart

and Anderson 1986, Noss 1997). These southwestern riparian ecosystems have continually suffered as demands on water resources increase. This situation calls for a regional and systems approach to water resource conservation, one that recognizes the interconnections between aridland river systems and their surrounding watersheds. Thus, a successful conservation strategy for the waterways of GCNP should embrace a regional river system and watershed-based approach to WSR designation, as opposed to the segment-by-segment approach adopted in most



Saddle Creek Falls. Grand Canyon's wild, free-flowing waters are central to the ecological integrity of this remarkable landscape. Photo by Joel C. Barnes.



WSR proposals. The segment-by-segment approach has proved to be a painfully slow political process, and overlooks the ecological importance of riparian areas as a keystone habitat in aridland ecosystems like those in Grand Canyon. A GCNP WSR omnibus bill could be patterned after WSR bills already passed into law in Michigan, Oregon, and Alaska (Raffensperger 1993). WSR legislation for Grand Canyon's river and tributaries would protect a contiguous portion of the Colorado River system, would dramatically increase protection of the region's biodiversity, and could place these arid-land waters at the heart of a regional conservation strategy.

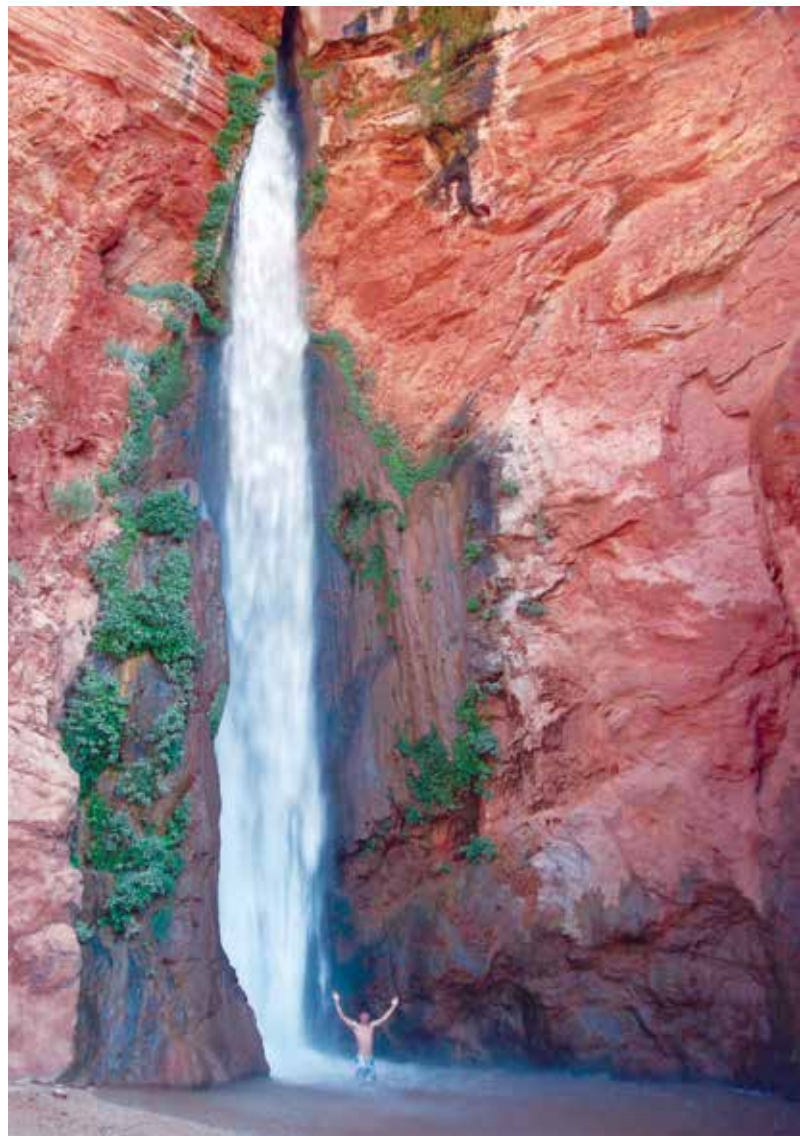
#### THE WSR STUDY PROCESS

Before Congress legislates a WSR designation, a WSR study process is conducted by the lead federal land agency managing those lands and it involves three steps—eligibility, classification, and suitability. For a waterway to be eligible for WSR designation it must be free flowing and exhibit one or more “outstandingly remarkable values” as described in the Wild and Scenic River Act of 1968 (WSRSA) (U.S. Public Law 90-542). Once a river or stream segment is determined to be eligible, it is then given a tentative classification of either “wild,” “scenic,” or “recreational.” These categories reflect levels of development and natural conditions along a river segment. Finally, the suitability step evaluates the consequences of designation and the manageability of the river if it is designated, which would consider biological, political and economic factors. After the WSR study process is complete and depending on its recommendations, Congress is then prompted to act with legislation, which can take years and even decades to occur (Crumbo 1996).

#### WHAT WOULD WSR DESIGNATION DO FOR THE ECOREGION

WSR designation in GCNP would mandate protection for the exceptional natural and cultural values of the Colorado River main stem and tributaries, particularly those “outstandingly remarkable values” (ORVs) identified in the eligibility and suitability steps of the WSR study process. Moreover, identifying in the WSR study process the unique wilderness values that enhance river recreation on the Colorado River through Grand Canyon would establish important legislative and management connections between the park's (currently proposed) wilderness and its wild and scenic rivers. The WSR also recognizes preexisting types and levels of river recreation where they do not conflict with the existing goals of

river management. However, the WSR does not freeze the status quo in a river corridor when it is designated. Rather, the WSR codifies a “nondegradation and enhancement policy” for all designated river areas, regardless of classification. These details are mentioned here to elucidate important differences and similarities between the Colorado River mainstem and the tributaries in terms of the biopolitics of WSR designation and management. For example, by identifying ORVs along the tributaries that are directly dependent upon existing base flows (e.g., riparian vegetation, wildlife and fish), the WSR study process could help set a legal stage for protecting future instream flows of the seeps, springs and tributaries in and around Grand Canyon. Since the Act acknowledges existing river management



Deer Creek Falls. Instream flows of tributaries like Deer Creek would be better protected with WSR designation.  
Photo by Joel C. Barnes.

goals, designation would not impose any significant influence on the scheduled flows (essentially Glen Canyon Dam releases) of the Colorado River.

The upstream existence of Glen Canyon Dam would not violate the “free flowing” criterion of the WSRA as evidenced by other such situations where river segments were designated below existing dams. More importantly, in regard to the Colorado River main stem, designation would finally put to rest any of the dam proposals that are proposed from time to time in Congress. The WSRA provides the highest level of legal protection available to ensure that no dam projects from Congress would be authorized for the Grand Canyon.

The WSRA’s allowance for preexisting types and levels of river recreation, where they do not conflict with the existing goals of the rivers management, could be interpreted to support the controversial status quo of commercial use on the river (including large motorized trips). Moreover, popular interpretation of the WSRA states that WSRS are managed primarily for the values for which they were designated (IWSRCC 1999). Additionally, the WSRA codifies a non-degradation and enhancement policy for designated rivers, and directs administering agencies to improve conditions in river corridors where necessary.

#### IF NOT NOW, WHEN?

Grand Canyon National Park is currently in the process of revising its Backcountry Management Plan (BCMP), which represents the best opportunity for gaining WSR status for the Colorado River and its tributaries. Unfortunately, in the initial phase of the BCMP public scoping (held in Fall 2011), WSRS were identified as an issue beyond the scope of the plan (NPS 2011). This is particularly puzzling in light of the fact that, in early 2000s when the Colorado River Management Plan was being revised, the park took this same “beyond the scope of the plan” position, and assured stakeholders that WSRS would be included in future plans or processes, most likely in the next BCMP revision (NPS 2002). If the park passes up this chance to designate WSRS, the future possibility of WSRS in the park would be uncertain at best. In light of the fact that the park’s original 1980 wilderness recommendation has yet to be forwarded to Congress, we could find ourselves “waiting for Godot” in regards to both wilderness *and* WSR designation in GCNP (Crumbo 1996). The next opportunity for public input on the park’s BCMP should be sometime this spring. In the meantime, for more information you can visit <http://parkplanning.nps.gov/grca>.

Joel C. Barnes

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Note: An expanded version of this article will appear in the spring issue of the *International Journal of Wilderness*.

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## Save The Dates

### CANYON AND RIVER MEDICINE WFR RECERTIFICATION

Sponsored by GCRG and DMI

February 22–24, 2013 (Wing Ding weekend!)

COST: \$225

LOCATION: Arizona Raft Adventures, Flagstaff, AZ

### BACKCOUNTRY FOOD HANDLER’S CLASS

March 29, 2013 (tentative, details forthcoming)

LOCATION: Marble Canyon Lodge

### GUIDES TRAINING SEMINAR LAND SESSION

March 30–31, 2013 (Easter weekend)

COST: \$45 (unless you’re sponsored by your outfitter)

LOCATION: Hatch River Expeditions, Marble Canyon AZ  
*Don’t miss our “Go Big or Go Home” 25TH Anniversary Celebration!*

### GUIDES TRAINING SEMINAR RIVER TRIP

April 1–7 (upper half), April 7–15 (lower half)

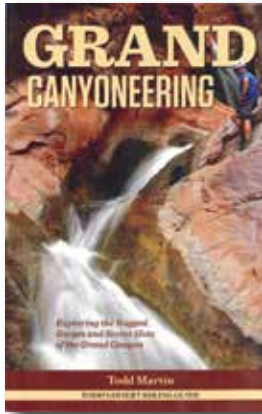
COST: \$275 upper, \$350 lower

*Talk to your outfitter now! See the GTS page of the GCRG website for information and freelance requirements*

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## Book Reviews



*Grand Canyoneering Exploring the Rugged Gorges and Secret Slots of the Grand Canyon*, BY TODD MARTIN, Todd's Desert Hiking Guide, Phoenix AZ, 2011, 500 pages, \$29.95, ISBN 978-0978961435.

I THINK IT WAS Jack Sumner, from the first Powell expedition, who originally came up with the term “canyoneering” to refer to

what they were doing when they explored the depths of the Grand Canyon using boats. And of course one of the commercial companies is Gaylord Staveley’s “Canyoneers,” so the term still retains Sumner’s original meaning.

However, in recent years it has also evolved—or been co-opted—to refer to what might be more accurately described as “Technical Slot Canyon Canyoneering”—the descent of slot canyons, usually but not always wet, using techniques pioneered by climbers (of rocks and mountains), cavers and—as we shall see—even river runners.

Most river runners know about at least a few of the neat slot canyons that are tributaries to the main canyon: the lower end of Blacktail Canyon is probably the best known, but hikers and some river runners have certainly seen the Redwall Narrows in South Canyon and the Tapeats Narrows in Deer Creek Canyon as well. Lesser known (and more difficult) slots within Grand Canyon are abundant, but not as well known and—until fairly recently—have remained largely ignored or unexplored.

In the last couple years that has changed: a small, but dedicated, group of robust technical canyoneers has mounted a full-scale attack on “The Last of the Great Unknown”—the remaining unexplored slots in Grand Canyon, mostly but not entirely in the Redwall Limestone.

Todd Martin’s book *Grand Canyoneering* is a beautiful and informative report on this “work in progress.” It is also a guidebook featuring some 64 different hikes involving technical canyoneering skills, many of these involving canyons previously unexplored. The author and his companions have worked their way through about half of their designated target canyons, which have been found using topo maps, aerial photography, and careful study of the routes used—as well as ignored—by Har-

vey Butchart and other serious backcountry explorers.

This book will be a real eye-opener for many dedicated Grand Canyon river runners. In addition to many beautiful photographs, route descriptions, and numerous maps, there is a fair amount of material about equipment and techniques used by “canyoneers,” natural history of the canyon, permit requirements, and “packrafting.” If you haven’t been following what these guys have been up to, at least some of this will come as a surprise. And you’ll enjoy the great photographs of many places we probably will never see in person.

The majority of these “hikes” involve rappels of more than 100 feet; many are over 200 feet, and the longest ones exceed 400 feet. While some of these hikes are readily accessible, others involve several days of off-trail backpacking to reach the beginning of the slots, where the real fun begins. Slots with running water usually require a wet suit, waterproof packs for your gear, and may involve rappels into pools, which may be difficult—even impossible—to get out of on the other side. Flash floods, of course, would be deadly in a slot canyon.

A lot of this stuff resembles what serious cavers have been up to for the past fifty years or so, but there are some significant differences as well. For reasons of practicality, canyoneers prefer to make one way trips: down thru the slots, across the pools, ending at the river. This involves pulling ropes down at the bottom of drops, so they can be carried along and used again at the next one. Cavers generally have to go back the way they came, which may involve leaving fixed ropes in place at each drop.

Needless to say, once you pull your rope down—cutting off escape the way you came—you are fully committed. Planning and research are critical aspects of this type of exploration.

Rigging points are critical for both cavers and canyoneers, and for years drilling holes and placing expansion bolts to hold hangers has been traditional. But the gradual proliferation of bolts in Grand Canyon has caused the NPS to ban the placement of any more—they are frequently regarded as an eyesore by non-canyoneers. Canyoneers now depend on “natural” anchors like boulders, large rocks piled together, rocks wedged in cracks, etc. Still, a one-way trip means a certain amount of gear (webbing and rap rings) will be left behind. Under new rules, any abandoned webbing must be black which is thought to be less visible, and canyoneers try to minimize the evidence of their passage.

Some routes leading to the river don’t have readily



accessible return hiking routes, so canyoneers have also come up with a creative alternative: “pack rafting.” “Pack rafts” are high tech tiny duckies, weighing as little as a pound and a half, and yet capable of floating a back-packer and his gear on flat water—“safely” if he also has a wet suit, PFD, and good judgement about when to get off the river and resume travel on shore.

Until recently, a few (very few, I think) backcountry hikers planned hikes that crossed the river. Sometimes they did this on their own, carrying some sort of floatation (“pack raft”), a wet suit, and a life jacket. Others elected to rely on boaters to get them across and would either make arrangements to meet a particular trip at a prearranged location, or research the places where they could depend of seeing boaters without having to wait forever—Bass Camp being a good example. As far as I know, these crossings were not mentioned in either the backpacking or river running regulations—presumably because few were doing them anyway, and the NPS may have not wanted to encourage more backpackers to try crossing the river. Appropriate rules for their use will be developed in the Backcountry Management Plan, now under development.

*Drifter Smith*



*Grand Canyon: The Stories and Photography of Bob Melville*, BY BOB MELVILLE, Blurb.com, 2012, 70 pages, more than 30 color photographs, \$75 (8x10), \$125 (13x17).

A LONG-TIME AZRA guide, Bob Melville, suffered a traumatic brain injury some years ago in an automobile accident. The physical and neurological effects have been quite devastating and Bob now lives in a long-term care facility, Emeritus of Flagstaff. While he is just a fraction of his former self, he appears comfortable and content under the circumstances. You will not be surprised to learn that Bob’s career as a boatman did not lead to great riches. He lives in our nation’s social “safety net” which (unsurprisingly) has a lot of holes (proper dental care and physical therapy for example).

Over the years, Bob took lots of great photographs, and told lots of fantastic stories. Many of his best Grand Canyon photographs—taken over 25 years—are collected here, along with a number of the stories he used to tell on the river. There’s also a short interview.

This is a great book that should appeal to anyone

who knows Bob or has an interest in the Grand Canyon and/or the “nearly truthful” tales told by river guides. It’s beautiful, and fun.

While all of the photographs were taken in the Grand Canyon, most of the stories are set elsewhere. If you know Bob, or have done a trip with him, you might find an old favorite among them, and others that you never heard. Although I have know and worked with Bob for several decades, many were new to me.

This book has been assembled by John Cassidy, a former river guide (who may be better known as one of the founders of Klutz Press), with the help of several of Bob’s friends.

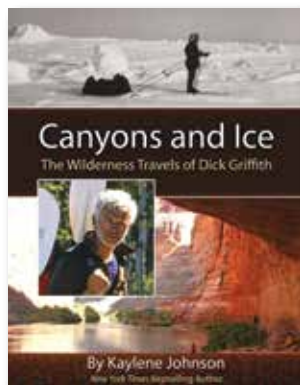
You can help Bob by ordering a copy of his book, which has been published on a “Print on Demand” basis, which means you won’t find it in a book store or at Amazon. Here’s how this works:

Go to Blurb.com, click on the bookstore, and search for Bob Melville. Bob’s book is available in two editions: the 8x10 bookshelf edition, for \$75; and the larger 13x17 coffee table edition, for \$125. Both are in hard cover, of professional quality, and come with a dust jacket.

On the Blurb.com website, you can preview Bob’s book if you’d like to see it before ordering. When you order his book, your copy will be printed and sent to you. Delivery takes about two weeks. All the proceeds, after the cost of printing go to Bob.

If you like his book and want to tell him (or drop by for a visit, which he would enjoy), here’s his contact information: Bob Melville, c/o Emeritus of Flagstaff, 2100 S. Woodlands Village, Flagstaff, AZ 86001.

*Drifter Smith*



*Canyons and Ice: The Wilderness Travels of Dick Griffith*, BY KAYLENE JOHNSON, Ember Press, 2012, 280 pages, \$24.95, ISBN 978-1467509343.

IT IS WITH GREAT pleasure that I see the life story of Dick Griffith has just been published.

I stumbled upon Dick’s exploits with his stunning wife and life companion Isabelle Galo while researching my latest book on Grand Canyon river runners.

The first river runners to run Lava Falls in Grand Canyon were the team of George Flavell and Ra-

mon Montez in 1896 as they piloted the wooden boat *Panthon* through the cataract. It took another 55 years before a rubber raft would attempt the run. That would be Dick Griffith, credited with the first run of Lava in a rubber boat in 1951. The photographer who documented his run was Isabelle.

A year later, Dick and Isabelle were pioneering routes through the Barranca del Cobre along the Urique River in northern Mexico, and by the close of the 1950s, Dick and Isabelle had moved to Alaska, where Dick began his love affair with long walks over the wilderness of the arctic.

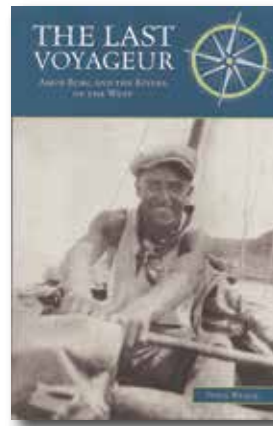
While the book recounts one man's love affair with wilderness, it also chronicles a change to the land and people of remote landscapes. Indeed, the remote Grand Canyon and Urique Barranca Dick knew are gone, and the arctic badlands now team with snow machines and sport hunters. At one point in 1999, late in Dick's wanderings, an old Eskimo woman followed Dick out of Cambridge Bay into the icy wildlands. Dick wrote in his journal "...She wanted to go back to the land where life was not easy but a happy one and like myself she must have loved the memories of a simple basic life."

While I would have liked to hear more about Dick's travels in the Himalaya, one of "...three magic places in this world," the book is filled with enough adventures to keep anyone occupied, and author Kaylene Johnson has done a superb job of recounting Dick and Isabelle's travels.

Even though Dick may not be the first person to travel through part of Grand Canyon in a packraft—that "first" possibly going to Frank Moltzen and Neal Newby in 1956—Dick's willingness to attempt the Lees Ferry to Diamond Creek section of the river, sans permit in 1991 in a packraft at the age of 63, demonstrates a willingness to test the boundaries of human endurance and our relationship to wild landscapes few others have attempted.

This January while the Grand Canyon History Symposium was underway at the South Rim of the Park, 84-year-old Dick Griffith was out making Grand Canyon history yet again. Dick and a small group of friends launched from Lees Ferry for another river run through Grand Canyon by boat. Sixty-two years after his first run of Lava Falls, Dick now holds the record for the longest span of Grand Canyon river running. I hope to see Dick on the Grand for many more years to come, and highly recommend this book.

*Tom Martin*



*Amos Burg: Voyageur of the Last River Frontier*, BY VINCE WELCH, The Mountaineers Books, 2012, 320 pages, \$24.95, ISBN 978-1-59485-701-0.

While the vast majority of river travelers throughout the world today boat using inflatable "rubber" rafts, that wasn't always so. Boaters in Grand Can-

yon should be familiar with the name of Amos Burg, if not that of *Charlie*, the "first inflatable boat to traverse the canyon, run by Amos Burg in 1938," as stated in the Belknap/Westwater Book's *Grand Canyon River Guide*. Hopefully, readers of the *Boatman's Quarterly Review* also should be familiar with the name of Vince Welch, who is the co-author of a biography of Buzz Holmstrom and writer of many of this publication's articles on Buzz and Amos Burg. If not, Welch's latest book, *The Last Voyageur: Amos Burg and the Rivers of the West*, should bring both Burg and Welch some well-deserved additional recognition.

Naturally, river runners of the Grand Canyon might want to begin *The Last Voyageur* with Chapter Eight, "Burg's Experiment: The Green and Colorado Rivers." Burg had read in a February 1938 *Saturday Evening Post* about Buzz Holmstrom's solo 1937 voyage down these rivers and contacted his fellow Oregonian. As a naïve teenager, Burg had set the goal of running the entire lengths of major western rivers and had not run one in almost a decade. They combined forces, with Burg filming and making an Academy Award-nominated documentary about Holmstrom's solo voyage the year before, and Holmstrom being able to run the rapids he previously had to line or portage, thus making him not only the first solo voyager but the first to run all the rapids. Burg "needed a lightweight boat, one he could carry his camera gear in safely, maneuver in the rapids (and portage or line when necessary) with ease, yet sturdy enough to take a beating. He made no mention of taking *Song o' the Winds*," his rowing canoe, one of a series he used for most of his previous river trips. Charlie Wheeler, Burg's raft's namesake, introduced him to the executive vice-president of the B. F. Goodrich Tire Company, who referred Burg to the Air Cruisers company, supplier of flotation devices for the U.S. Navy, who built the *Charlie* to Burg's specifications. "Burg had called this creature of his imagination 'an experiment in Colorado River voyaging.'" The 16-foot *Charlie* excelled in shallow water; flat-water rowing was slow,

but it could handle medium-size waves. After 74 days, Burg had become the first person to raft the Green and Colorado rivers, including the Grand Canyon. The *Charlie* is still alive, if not that well, as part of the Utah State Historical Society's collections.

That chapter is only one of twelve, and the Green and Colorado rivers only two of myriad, full-length river voyages Burg accomplished, in an era before most major dams had been constructed. Many of those voyages were the first ever, and nobody compiled as many as Burg. Because of dam-building, Burg was often the last to boat the lengths, among them: the Yellowstone, Missouri, Mississippi; Middle Fork, Salmon, Snake, Columbia; Athabasca, Slave, Mackenzie; Yukon; and the Fraser. Often alone, sometimes with a companion or two but not usually the entire trip, Burg could find himself in trouble, with or without an assistant. Many times while reading I would think "Burg could have died here—why didn't he." Sometimes he could be meticulously detailed but not make the best decision—boating the Columbia in the late fall/early winter, on crutches; crossing the Columbia Bar at the meeting of the Columbia River and the Pacific Ocean, in a canoe,

not once but twice, something with which even the best of ships' captains and pilots have trouble. Burg seemed to live a charmed life of adventure, which he turned into a career of journalism and photography, twelve articles for *National Geographic*, and over 45 films.

Burg did not limit himself to rivers, as he sailed to many countries, either by steamer but often in boats of his own. He went to sea at the age of fifteen, then completed high school after he returned at age 22, and immediately finished college. In fact, I found these chapters to be among my favorites, particularly when he sailed, motored, and rowed (yes, rowed) to Tierra del Fuego and Patagonia, following in the "footsteps" of Charles Darwin and the *Beagle*. With one companion in a "twenty-six-foot, self-bailing Beebe-McClellan surfboat" towing a dory as a tender, Burg and Ray Pepper braved the wilds and the winds of the tip of South America for almost four months. Harrowing? You bet! It will keep you on the edge of your easy chair. You'll want to read this Amos Burg book by Vince Welch more than once, that's for sure.

C. V. Abyssus

## Back Of The Boat— The Whale Foundation News Bulletin

### 11TH ANNUAL WING DING

EVERY YEAR THE Whale Foundation throws a big party. The Wing Ding is our primary fund raiser but more importantly it is an opportunity to catch up with old friends and just have a great time. We are proud to announce the Eleventh Annual Wing Ding is on Saturday, February 23RD, 2013 from 6:00–11:00 P.M. at the Coconino Center for the Arts (2300 N. Fort Valley Road) in Flagstaff. There will be dinner and music, a kid's corner, a huge silent auction with lots of beautiful art, books, services, and getaways donated by the river community. See you there!

### BOARD OF DIRECTORS

A heartfelt thank you goes to John Crowley and Derik Spice for serving on the board for the past three years. Derik served as our treasurer and John helped guide the Health Services Committee where he has generously offered to stay on. We couldn't run this boat without the help of guides who have stepped forward and volunteered. Thank you!



### THE 2013 WHALE FOUNDATION CALENDAR

What could be better than a calendar filled with beautiful photos of Grand Canyon landscapes. Here is an incredible shot of the river taken by Kelly McGrath. Check out our Facebook page to see some more amazing images you will find inside the calendar: [www.facebook.com/WhaleFoundation](http://www.facebook.com/WhaleFoundation). Calendars are \$12/each and \$3/each shipping. Order now by calling our business line at 928-774-9440. You can also just send us a check for \$15 to; P.O. Box 855 Flagstaff, AZ 86002 and we will send you one. There are a handful of retail stores in Flagstaff that carry it too; you can find a list of these stores on our Facebook page. If you order ten or more, the price drops down to \$10/each (no shipping costs).

**February 2013**

**Mile 116**

**Kelly McGrath**



# Long-term Change Along The Colorado River In Grand Canyon National Park (1889–2011)

THE COLORADO RIVER and its riverine resources have undergone profound changes since completion of Glen Canyon Dam in 1963, as every river runner with any history in Grand Canyon will attest. Long-term monitoring data are difficult to obtain for high-value resource areas (Webb et al. 2009), particularly in remote parts of national parks, yet these data are important to determining appropriate actions for restoration of resources and (or) potential modifications of flow releases on regulated rivers. The river corridor through the bottom of Grand Canyon creates a challenging environment for change-detection monitoring techniques (Belnap et al. 2008).

One long-used method for evaluating change uses ground-based repeat photography to match historical images of landscapes (Webb et al. 2010). The Brown-Stanton and Stanton river expeditions of 1889 and 1890 had the goal of photo-documenting a proposed railroad route through the canyons of the Colorado River, including Grand Canyon. The expedition had a professional photographer, Franklin A. Nims, who used a large-format camera to take all the 1889 images and a few in the winter of 1890 before injuring himself; after Nims was evacuated at Ryder Canyon, Robert Brewster Stanton took over the photographic duties and created the lion's share of the images of Grand Canyon. These expeditions produced a total of 452 large-format images of Grand Canyon that are preserved at the National Archives in College Park, Maryland, with photograph albums stored elsewhere. Another 60 images created by Nims are available for Cataract Canyon and its approaches in Canyonlands (Webb et al. 2004). These images are unsurpassed in the southwestern United States as a single collection taken over a short time period that documents one resource, because most photo collections span a considerable geographic area over a much longer time period.

Although some of the Stanton photographs were matched in the 1970s (Turner and Karpiscak 1990), most were matched from December 1989 through March 1993 using medium- and large-format cameras. Interpretations of changes apparent in comparisons of originals and matches were published in several places, notably in Webb (1996). This unique set of images documented a variety of geomorphic and ecologic changes along the corridor of the Colorado River, including occurrence of debris flows that altered rapids, changes in riparian vegetation along the river corridor, effects of feral burro grazing on desert vegetation, the extreme longevity of

certain desert shrubs, and the influence of warming winter low temperatures on populations of frost-sensitive species (Webb and Bowers 1993, Bowers et al. 1995, Webb 1996).

In 2010 and 2011, we repeated those matches using several of the same cameras used in 1989–1993 about 120 years after the originals (Webb et al. 2011). These new images document changes in upland and riparian ecosystems along the river corridor, including change in the desert plant assemblages that are unrelated to dam operations. Preliminary analyses suggest that some of the changes documented from 1889–1890 to 1989–1993 are continuing, showing the response times of these ecosystems to climate change, flow regulation and changes in flow management.

## CHANGES IN DESERT VEGETATION

Repeat photography of sites with hot-desert vegetation shows that the framework of the plant community is anchored by long-lived species such as Mormon tea (*Ephedra torreyana* and *E. nevadensis*) and creosotebush (*Larrea tridentata*). These sites are extremely stable, often showing little or no change after 120 years (figure 1). Many species, notably creosotebush, Mormon tea, catclaw (*Acacia greggii*), mesquite (*Prosopis glandulosa*), and blackbrush (*Coleogyne ramosissima*), have individuals that live longer than a century (Webb 1996). With the recent work, we now know that Mormon tea and creosotebush have low rates of mortality even after 120 years. The 1990s matches showed that species-specific mortality rates (percentage of individuals that die per century) were 18% for Mormon tea and 7% for creosotebush (Bowers et al. 1995). Initial results of the second matching effort suggest that, in fact, these mortality estimates are high and these species live longer than previously documented.

Recruitment has exceeded mortality for most species, resulting in a net increase in individual plants identifiable in most matches. Because of this, there are more desert shrubs and trees along the river corridor than were present when Stanton went through Grand Canyon in 1890. In addition, some species, especially creosotebush, had much larger individuals in the 1990s and 2010s (figure 1), reflecting a general increase in biomass documented in most of the views. We believe these changes are related to the late 20TH century wet period, which occurred between about 1975 and 1995 (Hereford et al. 2006), and a longer growing season.

We expected that the early 21ST century drought

(Hereford et al. 2006), the most severe in a century, would result in widespread mortality of long-lived species along the river corridor. Our preliminary observations suggest, however, that few individuals of these species died in the two decades between the first and second matches. The ongoing severe drought that began in 2001 will likely represent future climate due to predicted increasing temperatures (Seager et al. 2007), and our preliminary results suggest that mortality of long-lived species may not increase correspondingly.



Figure 1A—Prospect Canyon, mile 179.3, view up Prospect Canyon from river left. (27 February 1890). In addition to views upstream and downstream from what is now the left scout point at Lava Falls Rapid, Stanton took this image looking up Prospect Canyon. The dominant shrub is creosotebush, and many barrel cacti are visible. (R.B. Stanton 620, courtesy of the National Archives)



Figure 1B—Prospect Canyon, mile 179.3, view up Prospect Canyon from river left. (11 February 1990). A cairn was found at the site of this triple set of photographs, one of the few physical signs of the Stanton expedition left in Grand Canyon. A century later, most of the creosotebush present in 1890 persist. One or two of the barrel cacti are in the same locations of individuals in 1890 but are likely not persistent; the number of barrel cacti present 101 years later is much larger than in the original view. (R.H. Webb)



Figure 1C—Prospect Canyon, mile 179.3, view up Prospect Canyon from river left. (27 September 2010). There has been little apparent change in the numbers of creosotebush after an additional 20 years. One of the ocotillos appears to have died, or died back. After 120 years, the creosotebush have changed little in number but have clearly increased in stature, while the number of barrel cacti have increased significantly. (Bill Lemke, Stake 1510a)

The effects of the early 21st century drought, with its decreased winter precipitation, may be offset by normal or above-normal summer precipitation, which can be used by many (but not all) species that also occur in the Sonoran Desert.

Webb and Bowers (1993) and Webb (1996) proposed that a regional decrease in frequency of extreme freezes would lead to an increase in frost-sensitive species along the Colorado River. The number of barrel cacti (*Ferocactus eastwoodii*; figure 1), which are common in western Grand Canyon, increased by an average of sixfold between 1890 and the 1990s, a result attributed in part to decreased frost frequency (ref). Such increases have continued over the last 20 years (figure 1). Numbers of brittlebush (*Encelia farinosa*), another frost-sensitive species, increased substantially between 1890 and the 1990s, with this likely also attributable to a rise in low temperatures (Webb and Bowers 1993; figure 2). This short-lived species has had considerable mortality over the previous two decades; however, since recruitment has exceeded mortality, we observed an overall increase in individual plants and biomass on the desert slopes.

#### CHANGES IN BIOLOGICAL SOIL CRUSTS

Biological soil crusts are communities of cyanobacteria, mosses, and lichens that dominate the soil surfaces of most desert regions (Belnap and Lange 2003), including those in Grand Canyon. These organisms provide important ecosystem services, including surface stability; nutrients, especially nitrogen; and carbon to soils. Biological soil crusts are considered well-developed if they have a high number of lichens and mosses. Those



present in Stanton views are especially well-developed on limestone substrates and moderately well-developed on sandstone-derived soils. Soils derived from meta-



Figure 2A—Bass Camp, Mile 108.5, view upstream from river right. (17 February 1890). John Wesley Powell and his geologist, Clarence Dutton, had warned Stanton that he would not find a level place to serve as a switching yard. With a touch of sarcasm, Stanton called the place where he would have built such a yard “Dutton’s Depot.” After the crew lined Bass Rapid and stopped for lunch just below, Stanton climbed up about 300 feet above the river to make one last view of his proposed switching yard. The extensive foreground shows ten individuals of Mormon tea and a few spiny asters. A prickly pear appears at lower right. (R.B. Stanton 518, courtesy of the National Archives)



Figure 2B—Bass Camp, Mile 108.5, view upstream from river right. (20 February 1992). We first replicated this view in 1990, but returned two years later to replicate the view under conditions more similar to those in 1890. Unfortunately, the bright sunlight of 1992 caused considerably deeper shadows than those caused by cloudy conditions in 1890. Only three of the individuals of Mormon tea have died during the century; all were in the center of the 1890 view. In contrast, brittlebush, shown here with its silvery leaves and hemispheric shape, dominates the assemblage, with about ten individuals now appearing in the view. The prickly pear did not persist, and spiny aster no longer appears in the foreground. (Steve Thornstrom)



Figure 2C—Bass Camp, Mile 108.5, view upstream from river right. (22 September 2010). Many of the same brittlebush individuals that were present in 1992 are still alive; two have died. Most of the Mormon tea that had persisted the preceding century are still alive, but several more have died, notably in the lower right foreground and in the center of the view. This turnover in Mormon tea is unusually high compared to most views in Grand Canyon. (Bill Lemke, Stake 1479)

morphic rock have a low cover of lichens and mosses, but are still dominated by cyanobacteria. Crusts with more moss and lichen species contribute greater nutrients and stability than those that mostly contain cyanobacteria.

Biological soil crusts have low resistance to compression by feet or hooves, but they are extremely resistant to drought. Our repeat photos show that where these communities are undisturbed by animals or humans, which is the case in most of the Stanton views, there is almost no detectable change in extent or appearance (Webb 1996, figure 3). Further analyses will be required to determine changes in biological soil crusts, if any, in undisturbed sites. In contrast, areas that overlook rapids or favorite visitation spots show a complete, or almost complete, loss of soil crusts to trampling (figure 4).

#### CHANGES IN RAPIDS

In the century spanning the original and matched images, debris flows occurred in approximately 60% of the 160 tributary canyons documented by Stanton photographs (Griffiths et al. 2004). Webb (1996) reported changes and lack of changes to numerous rapids, and the matches from 2010–2011 yielded little new documentation on debris flows in Grand Canyon not known from other evidence, including direct observations, repeat photography, and analysis of aerial photographs. In the last 120 years, Lava Falls and Granite Rapids have had the most debris flows (six and five, respectively) and arguably have changed more than any others in Grand Canyon, and these rapids were large navigational hazards in Stanton’s day (figure 4). Crystal Rapid, which



was greatly enlarged during a debris flow in 1966, represents the greatest change in navigation hazard. On the other hand, some rapids have not changed in over 120

years, including Hance and Horn Creek Rapids as well as several rapids in the Jewels (Webb 1996).



Figure 3A—Garnet Camp, Mile 114.2, view upstream from river right. (19 February 1890). The day began hard, with a portage around Waltenburg Rapid, then ended easily for the Stanton expedition. In the afternoon, the cloudy sky of morning turned to sunshine, and the rough whitewater turned into a mostly quiet reach between cliffs of schist and granite. At mile 114.2, the expedition stopped and Stanton climbed up the right bank to capture this upstream view. Stanton's view is not totally clear in the center foreground; few desert plants can be identified beyond a pygmy cedar (*Peucephyllum schottii*) at lower left, and a distinctive patch of biological soil crust appears above it on the left edge of the view. (Stanton 539, courtesy of the National Archives)



Figure 3C—Garnet Camp, Mile 114.2, view upstream from river right. (23 September 2010). The new camera position is slightly to the right, but the various geologic and botanical features are still readily identifiable. Many of the foreground plants have grown considerably in the intervening 17 years between photographs, including Mormon tea, sweetbush, wire lettuce, and grizzlybear pricklypear. The biological soil crust, on the other hand, has suffered from trampling, likely by bighorn sheep, although its outline is approximately the same after 17 years. (Bill Lemke, Stake 2544)



Figure 3B—Garnet Camp, Mile 114.2, view upstream from river right. (1 March 1993). The pygmy cedar at lower left is dead. But at the lower left, the dark black soil surface is a biological soil crust that is still in the same position and approximately the same size a century later. Careful examination of the edge nearest the camera indicates the crust has retreated a maximum of about 15 cm; the edge farthest from the camera is nearly unchanged. cursory examination of its surface indicated the crust contains mosses and lichens, which is suggestive of an old, complex assemblage of organisms. (Steve Tharnstrom)



Figure 4A—Crystal Rapid, mile 98.2, view downstream from river right. (8 February 1890). Before 1966, Crystal Rapid was a benign, long riffle, especially in comparison with the rapids a short distance upstream and downstream. Had the Stanton expedition not lost a boat upstream in Horn Creek Rapid, Stanton likely would have decided to run this rapid. Instead, the crew portaged their belongings and lined their boats on the right side. Immediately upon arriving here, Stanton did what many modern river runners do: he walked up to the scout point on the debris-flow terrace overlooking the rapid and took this photograph. His view shows biological soil crusts on the fine-grained soil between boulders and clumps of perennial grasses, five individuals of Mormon tea, a barren debris fan, and a long and wide riffle with no island downstream. (Stanton 248, courtesy of the National Archives)



Figure 4B—Crystal Rapid, mile 98.2, view downstream from river right. (1 February 1990). Stanton's view and its replicate illustrate a number of aspects of environmental change in the past century of Grand Canyon history. The change in the rapid, now one of the biggest on the Colorado River, was caused by a debris flow on December 6, 1966. An island, known to river runners as the Rock Garden, is prominent in the river downstream. Tamarisk, a non-native tree, chokes the once-barren mouth and debris fan of Crystal Creek, a perennial stream. Five individuals of Mormon tea persist on the edge of the debris-flow terrace, which likely is more than 10,000 years old. More subtle changes have occurred in the foreground, where biological soil crusts, which would have been very stable on this ancient debris-flow terrace, have been trampled by river runners intent on scouting Crystal Rapid. This impact has removed about three inches of soil from this site. (Ralph Hopkins)



Figure 4C—Crystal Rapid, mile 98.2, view downstream from river right. (22 September 2010). The riparian vegetation continues to increase, although native species seem to be increasing more in near-shore locations than the non-native tamarisk, which are increasing in size and stature. The five Mormon tea individuals, which were present 120 years ago, remain on the terrace edge. (Bill Lemke, Stake 1471)

No one with extensive Grand Canyon experience doubts that sand bars and campsites have decreased in size in Grand Canyon. Webb (1996) showed that decreases in sand bar size generally were greatest towards Glen Canyon Dam. Now, sand bars have decreased throughout Grand Canyon, particularly those used as campsites at higher flows (greater than 20,000 CFS). A large contributing factor is the increase in riparian vegetation within the last two decades, which has claimed large areas of once open sand that was available for use by river runners (figure 5). Surprisingly, the recent culprits generally are native species, such as arrowweed (*Pluchea sericea*) and seepwillow (*Baccharis salicifolia*), not non-native tamarisk (*Tamarix ramosissima*, *T. chinensis*, and their hybrids; Friedman et al. 2005). Camellthorn (*Alhagi maurorum*), a rather nasty non-native species, contributes to the reduction in open sand bars downstream from the Little Colorado River.

#### CHANGES IN RIPARIAN VEGETATION

Perhaps the greatest change documented in the 2010s matches, and certainly the most significant, is the increase in riparian vegetation along the Colorado River. Dam operations have reduced variability in annual flows, increasing discharge in formerly low-flow seasons and decreasing discharge during the early summer runoff period (Webb 1996). Reduced flow peaks, depleted of sediment, erode fine-grained bars, deposit coarser sand, and allow vegetation to encroach onto formerly active channel margins. In response to these hydrologic changes, there has been a transformative change in the distribution, abundance, and composition of riparian vegetation in Grand Canyon over the past 120 years. These changes are variable both in space and over time, ranging from imperceptible at some camera stations to striking state transitions at others; for example, some formerly bare channel bars and backwaters have been transformed into densely vegetated riverine marshes (figure 5).

Less striking but related changes in riparian vegetation involve the structural simplification and mortality of mesquite and net-leaf hackberry (*Celtis reticulata*), which once dominated the old high-water zone (occurring at about the 100,000 CFS stage). Before flow regulation, riparian vegetation in the area below the old high-water zone was scoured during the annual flood; the Stanton photographs generally show this part of the bank to be devoid of riparian vegetation. After construction and operation of Glen Canyon Dam, riparian vegetation established between the old and what became known as the new high-water zone (at about the 30,000 CFS stage). Between 1963, when the dam was completed, and the late 1970s, riparian vegetation—





Figure 5A—55-Mile Marsh, mile 55.8, view upstream from river left. (18 January 1890). This upstream view of the Colorado River from river left shows a mostly barren hillslope of colluvium derived from nearby cliffs of Muav Limestone (right side). A few Mormon tea appear in the foreground as well as one brittlebush, likely blurred in the wind because the exposure time was long; Stanton's camera had no shutter. The left side of this image shows what would become known as 55-Mile Marsh, but at this time, the site is barren sand with a few exposed boulders. One of the many backwaters once present in this wide, low-gradient reach appears at left center, and mesquite lines the old high-water line in the shadows. (Stanton 362, courtesy of the National Archives)



Figure 5B—55-Mile Marsh, mile 55.8, view upstream from river left. (5 February 1991). A century later, the vegetation in 55-Mile Marsh includes non-native tamarisk, along with the mesquite, catclaw, and common reed; other lower stature riparian species are undoubtedly present. This marsh is recovering from the high-water years of the mid-1980s, which removed much of the once thriving riparian ecosystem here and deposited considerable coarse sand in its place. Mesquite along the old high-water line at left center remains alive but has died back. The two Mormon tea individuals that were present in the foreground of the 1890 view are still alive 101 years later, but the original brittlebush is dead and a new one is closer to the camera station. (Ted Melis)



Figure 5C—55-Mile Marsh, mile 55.8, view upstream from river left. (19 September 2010). The density of the marsh vegetation has increased, especially the common reed that lines the shoreline, in part because discharges in the intervening 19 years have mostly been low with only brief flood releases. Unlike many reaches, the mesquite on the right bank appear to be alive despite flow regulation, which has negatively impacted the old high-water zone through most of Grand Canyon. Both Mormon tea individuals persist, although the one at front center is smaller; the brittlebush new in 1991 has died but three new plants appear in the view. (John Mortimer, Stake 2313a)

mostly non-native tamarisk—became established in this part of the bank (Turner and Karpisak, 1980), but much of this post-dam riparian vegetation was scoured and the bars re-worked by high flows between 1983 and 1986, leaving banks somewhat barren looking in the first Stanton matches between 1989 and 1993 (Webb, 1996; figure 5).

Mesquite now occurs mostly well above the new riparian zone, although new individuals have become locally established closer to the channel. Net-leaf hackberry, less common, is becoming established lower on the once-barren channel margins. Whereas non-native species like camelthorn, Bermuda grass (*Cynodon dactylon*), and tamarisk comprise much of the novel assemblages of the new riparian zone, a diverse array of native woody riparian and herbaceous wetland species contribute to the mixture. The more common native species include coyote willow (*Salix exigua*), arrowweed, seepwillow, cattails (*Typha* sp.), common reed (*Phragmites australis*), horsetails (*Equisetum* sp.), and sedges (*Carex* sp.). Goodding willow (*Salix gooddingii*) is restricted locally to certain sites.

Transformative changes observed in riparian vegetation in the Grand Canyon are readily attributed to reductions in flood discharges and sediment load by operations of Glen Canyon Dam. Between 1890 and the 1990s, encroachment of woody riparian vegetation below the old high-water zone—primarily non-native



tamarisk—was expected because of trends observed elsewhere in the region. From the 1990s to the 2010s, more native species have become established in this new, post-dam riparian zone. One important hydrologic change is the three short-duration prescribed dam releases with peak discharges of 40,000–48,000 CFS within the last 16 years (1996, 2004, and 2008); these so-called habitat/beach-building floods were released in the winter-spring seasons when viable seeds of some native species, but not tamarisk, were available.

The spatially rich collection of historical photos from the Stanton expedition, along with precise matches in the early 1990s and 2010s, indicate the need for a more nuanced view of riparian vegetation change along the Colorado River, replacing the simple view of a rather uniform invasion of non-native species. Encroachment of vegetation over the past two decades onto depositional surfaces that were unvegetated in the early 1990s suggests that there are a range of hydrogeomorphic environments that have responded, and may continue to respond, to subtle changes in flow management in the post-dam period. Despite relatively large dam releases, within the post-dam perspective of flood control, colonization of low-stage habitat continues, creating a much more structurally and compositionally diverse riparian assemblage than was present in the 1990s. This is consistent with a growing body of evidence that measurable shifts in riparian vegetation accompany modest climate-related shifts in flow regime for rivers across the Colorado Plateau that are less intensely regulated than the Colorado River (Allred and Schmidt 1999, Birkeland 2002).

### CONCLUSIONS

Repeat photography in Grand Canyon documents long-term change caused by a variety of processes, ranging from climate change to visitor impacts and the influence of Glen Canyon Dam. Upslope from channel margins under the direct influence of the Colorado River, a framework of long-lived shrubs and small trees with lifespans exceeding 120 years survived the extreme early 21st century drought. This desert zone is changing with the increase of frost-sensitive species, mostly cacti and brittlebush. The riparian zone continues to respond to changes brought about by operations of Glen Canyon Dam, including flood control, changes in seasonality of large dam releases, and diminished sediment supply. The net result in both desert and riparian ecosystems is an increase in apparent biomass on the landscape—Grand Canyon has never looked so green!

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### ACKNOWLEDGMENTS

Numerous individuals have contributed to this work, including professional river guides from OARS and Grand Canyon Expeditions. In 2010–2011, photographers William Lemke, John Mortimer, and Steve Tharnstrom and field assistants Lindsay Smythe and Fletcher Brinkerhof. All original photographs are from the National Archives and Records Service in College Park, Maryland, and are public domain. All matches are courtesy of the Desert Laboratory Collection of Repeat Photography in Tucson, Arizona. Diane Boyer and Helen Raichle performed the digital scanning and matching.

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# Complete The Vision: Permanent Protection For The Grand Canyon Watershed

AS LONG AGO AS 1868, America's leaders recognized the Grand Canyon as something marvelous and worthy of preservation for all Americans. The high forested Kaibab Plateau on the north rim and its rich wildlife drew the interest of outdoorsmen like Benjamin Harrison and Theodore Roosevelt. By 1905, Congress and President Theodore Roosevelt recognized that forests surrounding the Grand Canyon should be set aside "for the wild forest creatures...[to] afford per-

petual protection to the native fauna and flora."

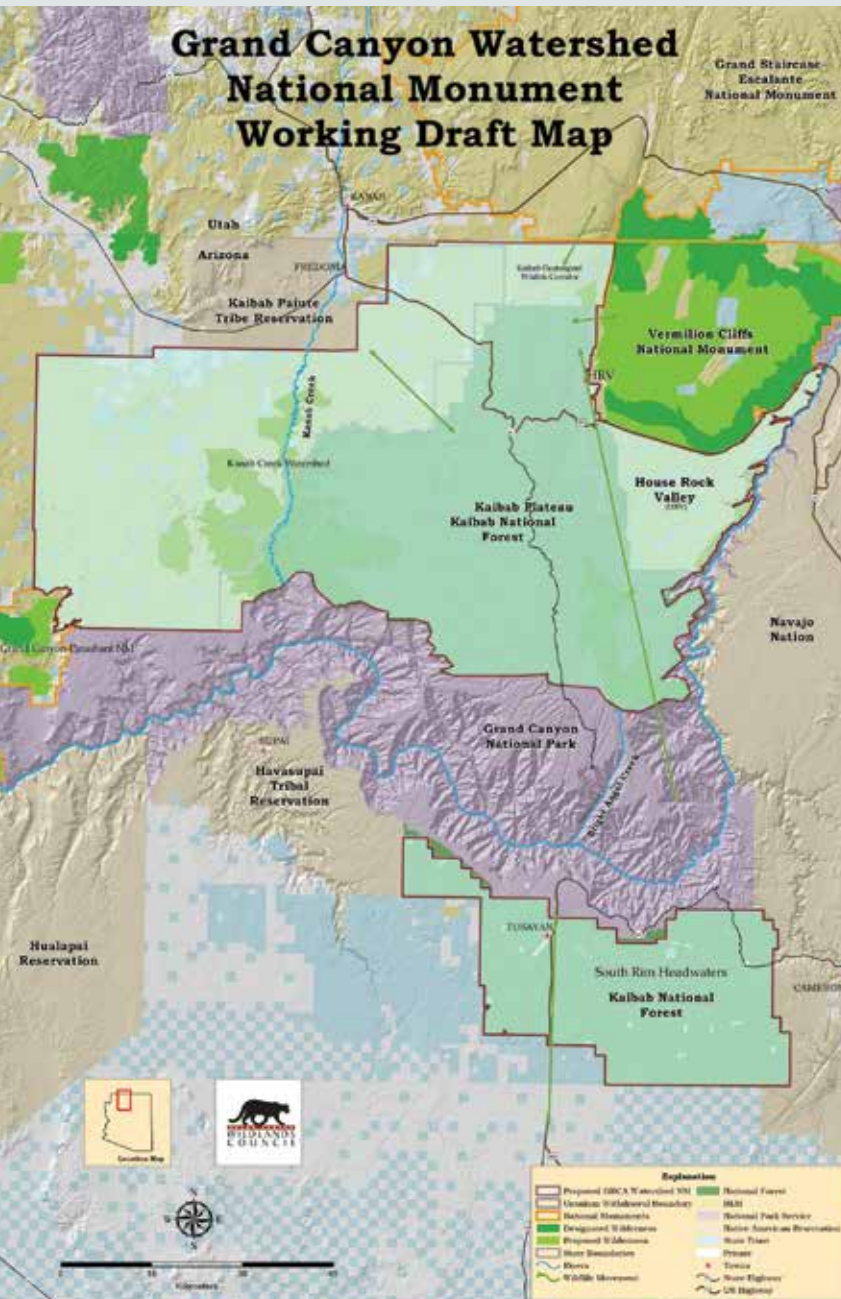
In 1906, and in accordance with earlier Congressional authorization, Theodore Roosevelt established the Grand Canyon National Game Preserve covering what we now know as Grand Canyon National Park and the north Kaibab National Forest, for "the protection of game animals...recognized as a breeding place therefore..." While that designation remains, it has unfortunately proven ineffective in preserving the full spectrum of native species and their habitat, especially large carnivores and the region's old growth forests and grasslands. Today we have an opportunity to fulfill the century-old vision of protecting the forests, grasslands, and wildlife surrounding and integral to Grand Canyon National Park.

## PRESIDENTIAL INITIATIVE

In 1908, President Roosevelt, frustrated with a Congress unwilling to defend the canyon from mining and logging industries, made good use of the recently passed Antiquities Act and proclaimed a Grand Canyon National Monument. A decade later, Congress finally established the Canyon as a national park. Subsequent national monument designations for the Toroweap region and Marble Canyon provided the foundation for a more complete Grand Canyon National Park congressional designation in 1975, affording significant protection of much of the Canyon proper but excluding most of the surrounding forested plateaus and grasslands. These forgotten picturesque lands, steeped in centuries of Native American tradition and lore, embrace a diversity of native wildlife and form Grand Canyon's most intimate watershed. It is within these lands that we propose a Grand Canyon Watershed National Monument.

## PROPOSED GRAND CANYON WATERSHED NATIONAL MONUMENT: AN ENDANGERED ECOSYSTEM *Kaibab Plateau*

The Paiutes called it Kai Awvahn, the "mountain lying down," and its people Kai'vahv Eetseng. Clarence Dutton, a seasoned explorer and geologist, described the mountain in 1880 as "the most enchanting region it has ever been our privilege to visit." Although







Marble View vista—This shows the mixed conifer of the Kaibab Plateau overlooking House Rock Valley and Marble Canyon. All except Marble Canyon lie within the proposed monument. Photo by Alicyn Gittlin.

still threatened by logging of ancient trees, climatic disruption, and recent large-scale high intensity fires, the Kaibab Plateau north of Grand Canyon National Park contains one of America’s largest, relatively intact, but most endangered ecosystems—Southwestern old-growth ponderosa pine forest.

### *The Watershed*

All the lands proposed for protection flow directly into Grand Canyon National Park and include the North Kaibab, the adjacent *House Rock Valley* grasslands, the *Kaibab-Paunsagunt Wildlife Corridor*, which provides wildlife safe passage between the Kaibab Plateau and Grand Staircase-Escalante National Monument, the rugged canyons of the *Kanab Creek Watershed*, and the *South Rim Headwaters* forest and woodlands. These lands, sacred to regional Native Americans and revered by those who followed, compose crucial habitat and wildlife movement corridors for a host of distinctive species. Species include the endemic Kaibab squirrel, northern goshawk, mule deer, mountain lion, pronghorn antelope, and the iconic and endangered California condor.

### *A 12,000-year Human Record*

The Grand Canyon Watershed holds lands of great significance to the Kaibab Paiute tribe, as well as Hopi, Zuni, Hualapai, Havasupai, and Navajo tribes, and

historically was home to the Clovis, Basketmaker, and Puebloan peoples. More than three thousand ancient Native American archaeological sites have been documented in the region, and represent just a fraction of the human history of the area. Ranging from settlements or habitations to temporary camps, granaries and caches, and rock art, some of the sites date from as far back as the Paleo-Indian period—11,000 BCE.

### THREATS

As the Southwest faces climate change and increasing probability of drought, preservation of remaining intact ecosystems is critical not only for wildlife, but for humans as well. Without permanent protection of the Grand Canyon watershed, these critical wildlands face substantial threats, including:

1. *Logging of ancient trees*—Lacking permanent protections, the old-growth ponderosa pine forests of the North Kaibab Plateau remain subject to destructive logging, threatening native wildlife diversity and climate resiliency. The Forest Service needs to protect and restore old growth forests, supporting appropriate economies for the use of small diameter trees while protecting the fire resistant old growth trees.
2. *Loss of landscape connectivity for wildlife*—The region lacks safe habitat connections between



Grand Canyon National Park and Grand Staircase-Escalante National Monument. These connections are more critical as the climate becomes warmer and drier. The U.S. Forest Service (USFS) and Bureau of Land Management (BLM) need to protect this ecologically critical wildlife migration route.

3. *Inappropriate grazing*—One of the most pervasive threats to the region, grazing leads to habitat degradation, shrub invasion, and soil erosion. Monument designation would respect existing grazing privileges, but would allow for permanent voluntary retirement of grazing permits.
4. *High density of primitive roads*—The use of old roads causes soil loss and vegetation damage which affects archeological sites and water sources, increases poaching and creates habitat fragmentation and barriers for wildlife. As a national monument, the USFS and BLM would regularly monitor, based on a scientifically credible methodology, the effects of the existing road network and mitigate unacceptable impacts.
5. *Uranium mining*—The potential for uranium mining continues to threaten the water quality, wildlife, and intact habitat of the Grand Canyon watershed.

As during Roosevelt's tenure, mining continues to wreak havoc on the Grand Canyon region. With the support of hundreds of thousands of comments from citizens and organizations across the country, the Department of the Interior announced a twenty-year ban on new hard rock mineral leasing and mining on one million acres surrounding the Grand Canyon on January 9, 2012. This area encompasses about two-thirds of the proposed Grand Canyon Watershed National Monument. Recent lawsuits filed by the uranium industry, as well as legislation proposed by anti-conservation members of Congress relentlessly pursue overturning the moratorium, a protection with overwhelming public support. While congressional action could make this withdrawal permanent, a national monument designation by the president is the best vehicle to permanently protect the water quality, wildlife habitat, and the scenic wonders of the region.

#### NATIONAL MONUMENT DESIGNATION

Lands owned by the federal government, not private lands, would be declared a Grand Canyon Watershed National Monument. Since congressional action is unlikely in the foreseeable future, the President's authority under the Antiquities Act to designate a national monument provides the most promising opportunity for permanent protection. As envisioned, the USFS and BLM would continue to manage the lands in close

cooperation with Grand Canyon National Park.

Formal designation affording permanent protection for the Grand Canyon watershed region allows for continued public access, rights of way, sightseeing, hiking, wildlife observation, birding, and many other activities, including traditional tribal access and uses. Hunting would be conducted as it is today, based upon state and federal cooperation. Permanent protection of this area would mandate conservation, protection, and restoration of old growth forests and grasslands, important archaeological sites, native wildlife, springs and wetlands, and wildlife migration routes.

#### PERMANENT PROTECTION BENEFITS THE U.S.

The Grand Canyon Watershed is a magnificent landscape held dear by both local Arizonans and visitors from across the globe for its clean water, thriving wildlife, beautiful scenery, quiet recreation, opportunities for spiritual renewal, and more. This special place is worthy—and in need—of permanent protection so current and future generations can continue to enjoy it.

#### ... AND SUPPORTS THE LOCAL ECONOMY!

Permanent protection of the Grand Canyon Watershed National Monument preserves the quality of life for local communities and creates economic benefits for local businesses. Headwaters Economics, an independent, nonprofit research group, recently studied the impact of national monument designation on communities in Arizona. Research shows that the areas neighboring Vermilion Cliffs National Monument and Grand Canyon-Parashant experienced job growth of 24 percent and 44 percent respectively after designation. Additionally, the Grand Canyon, which draws visitors from across the country, generates \$687 million for the economy in northern Arizona each year—while supporting 12,000 jobs, including river guides.

#### GRAND CANYON NEEDS YOUR HELP

The broader river community's active support will be critical in assuring the President, and the local businesses and elected officials, that long-term protection of the Grand Canyon watershed region makes both ecological and economic sense. It is, after all, the right thing to do to fulfill a century-old vision to protect and restore a complete Grand Canyon ecoregion.

For more information on the Proposal and how you can help, visit <http://www.grandcanyonwildlands.org/>.

*Kim Crumbo*

## Into Canyon, Time And Silence

**A**FTER FIFTY YEARS—half a century—of being in, around, through and over the Grand Canyon, some of my boatman friends still do not view me as a proper river person, and I agree with them. To be one of that tribe, it is essential to take the keenest interest in rapids and currents, and certainly in negotiating them with greatest skill; one must know about the quality of the camps and one must rejoice in getting a good camp even in the face of heavy competition; one must be prepared to convey groups of passengers through all those river miles, catering to their needs and their safety, showing them special places, and then basking in their admiration as superwoman or superman. The experience fundamentally is that of a small cohesive group of nomads traveling through the wilderness, prepared to deal with whatever may come, as our hunter-gatherer ancestors did for thousands of years. It is a dynamic and social experience that reminds me of Siegfried's Rhine Journey described musically by Wagner when, young and strong and innocent, Siegfried set off down the river looking for adventure and for tests of his strength and skill (less so of his knowledge and wisdom). Above all, perhaps, being a boatman implies being a part of the tribe and delighting in that select membership.

My take is altogether different. Not better or worse, mind you, just different. It is not a matter of fearing rapids, for I have rowed my share of them in the West; it is not a matter of disliking traveling in groups, for I have led many over the decades; nor is it a matter of not appreciating the river people, for in my opinion there are none finer, representing as they do the qualities that are so badly needed in our country at this time, but are in such scarce supply. No, the issue is something quite different, and I will let the shoe drop right now: for me, it really would not make that much difference if there were no rapids at all in the Canyon, though of course I will always appreciate fast water as opposed to the slack water that invariably brings forth headwinds. So, there it is, unthinkable and awful. Really, what is the matter with this guy?

The matter with this guy is that, for me, the Canyon lives most strongly in other things.

I love the sound of the river, from the silvery sparkle of shallow water making its way over gravel bars to the ominous sound, in the bass register, of the rapids.

I love the smell of the river, a rich compound of vegetation, clay, and the unmistakable perfume of desert water.

I love the returning swallows weaving spring into the

air, and the canyon wren issuing his shrill descending cascade that bounces from one rock wall to another.

I love the redbud's sprays of purple set off strangely against the red-brown or gray of the cliffs behind.

I love the secret red light in the canyons that becomes redder downwards with each reflection off the walls.

I love the coals-red light of sunset or dawn creeping along the cliff faces, and the stark pale almost unbearable light of the moon doing the same thing in obverse fashion at night.

I love the constellations that, so bright when seen from that narrow slot, coyly reveal themselves only at the last moment, when the key star emerges at last from behind the cliffs.

All these are things that boatmen are not insensitive to, of course. Perhaps it is a matter of degree. But there are things that really are the special domain of the field geologist, a person who goes everywhere in the course of studying and mapping, who goes to places that no one else visits because they are not interesting or challenging enough, and to other places that perhaps are too challenging for most but still must be inspected and recorded. In doing this, the geologist becomes suspended in time, which appears as a stately mental movie in which the present is merely one of a long sequence of frames. Thus, for example, I often envision a Canyon quite thickly populated by prehistoric farmers, with fields and dwellings scattered about, with irrigation ditches sparkling in the sun, with wisps of smoke rising here and there into the morning air. Or I journey farther back in time, to one of the ice ages, when the Canyon looked quite different from its present stark self, being thickly mantled by forests of conifers and deciduous trees, much like today's Canyon de Ordesa in the Spanish side of the Pyrenees in Aragon. Above all, I see the great river relentlessly cutting down, leaving behind as testimony terraces that are tens or hundreds of feet above the present river, mute evidence to its endless, ferocious power.

More than anything else, field geology is an activity that is wrapped in solitude and silence because only in solitude and silence can one hear the stories of the Earth. Therefore, I am comfortable with and love:

The solitude that sharpens the senses and nourishes the soul.

The silence so unbroken that even the faint whispers of Gaea, Earth, can be heard from time to time.

The dialog with the Ancient Ones, whose playful children left improbable stones on top of huge rocks

near Comanche Creek for me to find eight hundred years later.

The ancient trails in places where we moderns do not walk but the geologist does and the Ancients did, still visible today to those who have eyes to see them, and identified as ancient by the scatter of potsherds.

The little ditch, still faintly visible today, as are the associated farming terraces, that starts at Kwagunt Creek (then thirty feet higher than today) and winds its way in and out of gullies and ridges, with perfect ditch gradient, to a cluster of dwellings where people lived, grew vegetables, and enjoyed the great view so many centuries ago.

The now-arid and improbable-looking flat ground near Comanche Creek where charcoal layers show that this was a field where prehistoric farmers were growing corn even before the great Pharaoh Ramses II ruled Egypt, or Tutankhamen, or Akhenaton, he who worshipped the sun as we in the Southwest worship the sun; before the Israelites led by Moses left Egypt; and when the sack and burning of bronze-age Troy described by Homer were still far in the future.

I love the strand lines that mark ancient, mostly pre-dam, floods of the river, and show how the river functioned in the days before it was importuned by Glen Canyon Dam. These strand lines are fun to study because they tell so much about what was going on in the region. The great flood of 1883, estimated at 300,000 CFS, left huge trees and almost no artifacts excepting a few mine timbers; the 1921 flood also left large trees, and quite a few artifacts, but no beer cans or plastic objects; the bigger floods going back to shortly before the dam was completed reached about 125,000 CFS, and include decent trees and lots of artifacts, including steel beer cans of the kind that you had to open with a church key, but very few plastic objects; the 1983 flood, when the dam almost failed, only left small wood because trees were captured by Lake Powell, but the artifacts are very numerous and include aluminum beer cans and abundant plastic containers.

I could go on and on about the many interesting things that have been learned, but this is not the place to do so. Instead, I'd like to finish by mentioning how the gods of the Canyon showed me that they do appreciate silent unobtrusive interest and reverence.

On the last day of my last research trip we were camped at Tanner Beach. In addition to us geologists, my friend Ann Zwinger was there, I think; Raechel Running definitely was, acting as camp cook, La Cocinera. The weather was bad and a restless wind played fitfully with the sand. Gray turbulent clouds, mists and curtains of rain swirled around the Palisades and Comanche Point. It was not a heart-warming scene. Then, sud-

denly, the setting sun emerged from below the edge of the clouds far, far to the West, and the world was transformed. The angry swirls became an amazing play of colors—purple, orange, electric blue, gray blue, yellow, restless, always moving, constantly changing. In between, the great cliffs shone through in places, the color of live coals. There was no question of trying to photograph any of this—it would have been a sacrilege. The task was to see, to absorb, to remember, indelibly and forever. Absorb and remember I did then, and remember I do to this day.

The gods had spoken, telling me that the solitary, silent and respectful geologist, the wanderer, is also a member in good standing of the Grand Canyon People.

*Ivo Lucchitta*

## Monsoon Enuf!

**G**REAT MONSOON FLASH FLOODS this year, especially in the lower canyons—tho, Tuba City and Moenkopi got a big bunch of rain, too! (Yay, LCR sediment!! Beep says that “Moenkopi” translates to “dirt falling in”...)

If you haven't seen it, check out Joe Clark's YouTube video of National Canyon imitating Hermit Rapid (and the big Fern Glen flash video is on there as well). For the Hance debris flow pics (the left run is now a portage), check out Wayne Ranney's web site and blog “Earthly Musings”—as well as a posting of aerial pics by River Runners for Wilderness. Wayne's site has an amazing pic of mega-waterfalls coming over the limestone rim at Redwall Cavern, too!

The east half of Indian Canyon/206 Mile camp got de-sanded when a flash there left the drainage and came through the low spot. Numerous other beaches showed scars from monsoon rilling, sooooo—How about a High “Beach Repair” Flow!?

From Tuckup on down to Diamond Creek, we lost count of all the debris flows, but did manage to notice, just in time, that the left side of the river was full of new rocks at the 211 rock dodge riffle! “Wow,

look at that debris flow!—oh wait—hang on!”

*Greg Woodall*



Monsoon 2012—  
debris flow at mile  
211, river left.  
Photo by Greg Woodall.



## Our Immune Systems: Get Rid of the Sludge

**T**HIS SUMMER'S OUTBREAK of norovirus on river trips in Grand Canyon might have you thinking about how to stay healthy and strong. During our June river trip, we paralleled a private trip where everyone was infected with norovirus. The friendly smiles and beautiful people on that trip made it difficult to cut off contact with them. After high-fiving one of the gregarious women on the private, one of our boatman held his hand out from his body as he walked over to his boat to promptly wash his hands. "Forty-five seconds of contact," he said. He never got the noro. In fact, our entire trip remained noro-free despite double camping at Cremation and almost daily encounters with the infected private trip; granted we made sure not to touch them. Well, most of us did.

### *How is it that eighteen of twenty people on a river trip can get norovirus and the other two stay healthy?*

Clearly, each of us has a different resistance to infections. How is it that eighteen of twenty people on a river trip can get norovirus and the other two stay healthy? Can a strong immune system really prevent norovirus from taking hold in the body? Maybe. Maybe not. Viruses are patient opportunists. They are also obligate parasites and cannot live without a host. When the host (that's us) is weak, they take hold and commandeer our healthy cells to reproduce their genetic material for them. According to Dr. Andrew Weil, allopathic (conventional) medicine cannot effectively treat viral infections. It is up to us to keep our immune system strong enough to fight them early on. So what makes a strong immune system?

The immune system is incredibly complex. Let's start with the basics. The immune system is found throughout the whole body as tissues, lymph vessels and nodes and organs like the spleen and thymus. It begins in the bone marrow, where stem cells transform into many types of white blood cells that attack and neutralize germs, dead cells and malignant cells. White blood cells are stored in the thymus underneath the breastbone, in over 700 lymph nodes and in the spleen. After white blood cells attack germs and dead cells, they are escorted to the lymph nodes to be filtered. Lymph fluid eventually enters the blood. This

blood is sent to the liver and kidneys to be filtered. If there is too much "sludge" to be filtered, the body stores it to prevent it from reentering the system. With such a sophisticated system of defense, why do we all know someone who is very ill because of a compromised immune system? Dr. Andrew Weil explains how this imbalance can occur.

Once, as a college newspaper editor, I interviewed an expert on rivers, long before ecology and environmental concerns were fashionable...He told me that rivers are like living organisms in that they have many different mechanisms to keep themselves healthy. You can dump sludge into a river and, up to a point, the river can detoxify itself and remain in good health. For example, turbulence in a river mixes water with oxygen, a powerful purifier and germicide, as is ultraviolet light from the sun. Also, many of the plants that grow in rivers, both algae and higher plants, can remove contaminants from water. But if you keep dumping sludge, at some point you will exceed a critical level where natural purification mechanisms become overwhelmed and break down...a river that appears hopelessly polluted is not beyond help. If you will simply stop putting bad substances into it, eventually the levels of contaminants will drop to a point where the natural healing mechanisms revive.

—Dr. Andrew Weil, *Spontaneous Healing*, p. 81-82

This concept of immune system overload began to make sense when I learned about pancreatic enzymes. The pancreas produces enzymes to help digest food but these pancreatic enzymes are also an integral part of the immune system. They digest foreign substances as well. However, if we eat processed food, hormone-laden meat and cheese, chemicals and preservatives, all of the power of these sophisticated enzymes is used up simply to digest what we ingest. There is nothing left to help digest invaders like viruses, bacteria and mutated cells. Too much sludge.

The liver and kidneys too, when overloaded, cannot filter and neutralize toxins. In our modern world, it is impossible to isolate oneself from toxic exposure. Some researchers say that even at birth, we have over

70 chemicals already present in the body. The list is endless: hydrogenated oils, food dyes, perfumes, paint fumes, chemicals and preservatives in food, cleaners, shampoo and lotion preservatives like parabens and EDTA, car exhaust, off-gas from carpet and plastic, chlorine, sodium fluoride in water, heavy metals like aluminum, mercury in our teeth, vaccines, pharmaceuticals in wastewater. Too much sludge. Whew, my liver feels as overworked as I do after three back-to-back river trips!

Like the rivers, our bodies have mechanisms to keep us healthy. But we need to minimize the sludge by avoiding toxic exposure and eating nutrient-rich food. If you are exposed to toxins, take chlorella to neutralize heavy metals, pesticides and other toxins. Avoid hydrogenated oils, preservatives, food dyes, processed food and refined sugar. Eat fresh fruits and vegetables, whole grains and hormone-free animal products. Remember Hippocrates? "Let food be thy medicine and medicine be thy food."

But what if our digestive system is cranky? Immunity starts with a healthy gut. Good input and movement. No clogged pipes. Poop is a taboo subject that makes people giggle like first graders. But boatmen understand the importance of regular visits to the groover. Constipation causes serious illness because wastes are not transported out. Instead they are reabsorbed into the body and are sometimes stored in the tissues. If you experience indigestion, reflux, excessive gas or see undigested food in your poo, taking a digestive enzyme with each meal will help. Digestive enzymes help break down food into the minerals, amino acids, vitamins and other nutrients. These are the building blocks required to manufacture white blood cells, thyroid hormone, stomach acid and all of the necessary substances that make the body function.

Probiotics (a blend of friendly bacteria) can also help straighten out a cranky digestive system and boost immunity. Cranky digestion can result from antibiotics, undigested food, stress, toxic overload and poor food choices. Undigested food feeds "bad" bacteria that take up residence in our gut, thus offsetting the balance even more. When the gut and intestines are sufficiently colonized by "friendly" bacteria, the invasive ones are outnumbered and nutrients are absorbed properly. Good bacteria also help maintain the chemical balance (ph) in the intestines, which helps the body fight microbes. Some people even say that eighty percent of our immune power lies in the health of our digestive system. Probiotic supplements are widely available and are best taken with food. At least one full bottle of probiotics should be taken *after* any course of antibiotics, as antibiotics kill all bacteria

in the system even the "good" ones. Plain yogurt is a decent source of friendly bacteria, but if you are low on immune power or have had antibiotics, it is worth spending the \$40 for a bottle of concentrated probiotics.

Other healing substances that help build immune strength are the omega-3 fatty acids found in fish, especially salmon, sardine, anchovy and tuna, flax seed, chia seed, pumpkin seed, walnut, dark green vegetables like kale, collards, chard, parsley, and micro-algae like spirulina. Omega-3 oils work at the cellular level by fortifying the membranes of healthy cells so they are more resistant to foreign attacks. They also keep the blood thin enough to circulate efficiently through the body, thus aiding the disposal of wastes, dead cells and digested microbes.

There are numerous herbs that support the immune system. The Chinese species of astragalus (*Astragalus membranaceus*) increases general immune resistance by enhancing the action of white blood cells. It also enhances the production of antibodies and interferons, which are produced by the cells to heighten the sensitivity of white blood cells so they better recognize invaders. Dr. Andrew Weil recommends astragalus for people with chronic infections such as bronchitis and sinus, for those with cancer even while undergoing conventional treatment and for people lacking energy or feeling overwhelmed by stress. Another useful herb for good immune function is elderberry (*Sambucus nigra*), which according to herbalist DeeAnn Tracy Brown, causes the cell surface to become slippery. This makes it more difficult for viruses to attach to the cell membrane and thus can help prevent us from becoming hosts for these nasty little creatures. There is also a five-herb supplement that super-charges the immune system. Please contact me to get more information.

Like our beloved rivers, our bodies can be filled with sludge and attacked by invaders. The immune system can deal with an amazing barrage of toxins and germs. But one key to staying healthy is keeping the sludge at a level the body can detoxify. At the same time, we need to eat nutrient-rich foods. Just like the rivers, good health comes from paying attention to what we put in.

Call or email me anytime for a free consultation about natural healing approaches. Your questions help further my education. My email is Kristin.Husinga@nau.edu and my phone number is 575-536-3274. Thank you.

*Kristin Harned*



# Jack Schmidt

*This interview was recorded in about a half hour on a trip in 1994 that was put together by geomorphologist Bob Webb (egged on by Kenton Grua) as an addendum to the Stanton Photo Re-Match Project. That trip included Lois Jotter Cutter, Martin Litton, Joan Nevills, Woody and Sandy Reiff, Garth and Shirley Marston, Bob Rigg, Kent Frost, Les Jones, Tad Nichols, Gene Shoemaker, George Wendt, John Cross and John Cross Jr., to name just a few. Its premise was to elicit eye-witness testimony on the pre-dam river.*

*As this interview goes to press (November 19, 2012) the gates of Glen Canyon Dam are slowly ramping up for the latest beach-building flood flow experiment. Jack is down there right now to see how it's going. For more about Jack and his career, see <http://www.utahstate.usu.edu/winter2011/feature1.cfm>*

I HAD BEEN LUCKY ENOUGH to travel through Grand Canyon in 1981 on what will always be in *my* memory one of the great experiences of my life. Your first time through Grand Canyon is not like any other. We barely knew what we were doing, and we scouted every damn rapid on the river, and every time we went around a bend, we had no idea what was going to be downstream. We had no idea what any rapid looked like. There's no trip like that one.

That was a private trip. I'd entered the lottery and my number was drawn. It was a group of close of friends from Montana and California. We ended that trip far closer friends than we started. It really was a truly wonderful experience.

I subsequently decided to return to school for my Ph.D. At the time I was running a consulting business in Helena, Montana. So I'd returned to get a Ph.D. in my early thirties, and was pursuing a different research project in Montana. I was at the U.S. Geological Survey (USGS) offices in Denver talking to some colleagues about what they thought about the idea to work this particular project I wanted to do, and at the end of a whole day of conversation, I said to someone, "Well, those are my ideas about what to work on. Do you have any ideas? Are there any other research programs going on—something else that I might not know about that might be a good thing to hook into?" A friend of mine with the Geological Survey said, "Well, we're just starting to gear up in doing research in Grand Canyon, and they could use some help down there. If you thought you wanted to work in Grand Canyon, we might be able to get you involved." I barely needed time to file away that research proposal, what-

ever it was, and never looked at it again, and started working in Grand Canyon.

I got off a plane in Phoenix in May of 1984, got in a car with a Geological Survey person, drove up to Lees Ferry, and got on a trip. It was one of the first trips outfitted by Humphrey's Summit. It was one of the first and only multi-disciplinary research trips ever launched. It was a trip that involved several people from Arizona Game and Fish—Bryan Brown and the bird survey team—and Julie Graf from the USGS, and I. We had a motor-rig, Dan Dierker rowing an oar boat, and we were all spread out, but we all had to move at a pace established by whoever...just two humorous notes about that trip: one was the fact that all the folks from Arizona Game and Fish, they were working in tributaries. So their last work was in Havasu Creek. So they were completely finished working at Havasu Creek, but the bird work needed to go on downstream. So in May of 1984, we spent, I think, seven or eight days below Lava Falls with two-thirds of the people on the trip having nothing to do. The temperature reached—I think we clocked 113 degrees Fahrenheit in the shade one day at Parashant. That was one of the reasons those [multi-discipline] trips never happened again.

I also remember sitting below Lava Falls for a day in the hot sun with all the loaves of bread. Tom Moody organized us all to go through every loaf of bread, slice by slice, and punch out the green mold, because all the bread had turned moldy. We didn't have any bread that wasn't moldy, and rather than throw it all away, we sat and took it out slice by slice and punched out all the mold. So that was a pretty classy outfitting experience.

**STEIGER:** That was something for everybody to do while they were all...?

**SCHMIDT:** Right. Meanwhile, Bryan was off looking at birds. Anyway, that was the trip, and to show you how things have evolved over time, you might remember that in 1984 the original reason for environmental research in Grand Canyon was to study the incremental environmental impact of changing the peaking power operations from a high of 31,500 cubic feet per second, to a high of 33,500 cubic feet per second. That was the original mission of the Glen Canyon Environmental Studies (GCES)...was just to study that one small change.

The river was flowing at 45,000 cubic feet per second in May of 1984, because we were in a bypass spill situation, and a year earlier, the river had been

up above 90,000 cubic feet per second. I remember standing on the bank—I was down here looking for a research project. I didn't know what to work on. I remember saying to this person I was traveling with, "Well, it seems to me that we really ought to be initiating some studies on what these high flows are doing to this river system, and what's going on with sediment being transported by the river, and what's going on with the eddies, because here we have a river that's unusually flooding." And this person I was traveling with just dressed me down and told me that under absolutely no circumstances was I to spend any time working on research related to the river at these discharges, that in fact the only job of the Geological Survey was to study the effect of that incremental change in powerplant operations. And that I was not to do anything other than that. That really shows you the evolution of where we came from and where we are now [1994], just in terms of the GCES-related studies.

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*It's truly amazing, sometimes, what a little water under the bridge will bring about. Geomorphologist Jack Schmidt today is chief of the Grand Canyon Monitoring and Research Center (GCMRC), and as such, is ultimately responsible for managing the science program that supports the Glen Canyon Dam Adaptive Management Program. The body of science that has been developed there (and elsewhere) during the past twenty years—including much of Schmidt's own research in Grand Canyon and on other regulated rivers in the western United States—is the foundation of decisions that may determine the characteristics of Glen Canyon Dam operations for the next twenty years. (See LTEMP EIS.)*

*It's hard to imagine a better man for the job of chief of GCMRC. Having been a boatman on a couple science trips with Jack in the 1990s I can testify under oath that he is fanatical about getting good data: i.e. it must be honest, accurate, complete, and derived from intelligent questions in the first place. The guy would kill his own mother (and/or however many graduate students it takes)—to get the truth, the whole truth, and nothing but the truth.*

—Lew Steiger

\* \* \*

SCHMIDT: The next trip I did was in the summer of 1984, and I had no funding support, and so I just launched my own trip. My in-laws gave me a little money to stay alive, and we borrowed a boat from Brian Dierker and Tom Moody and I rowed one boat

down. And then we had an old snout that we borrowed from a friend that was completely overloaded. We hadn't bought enough food, so we did a 21-day trip without any leftovers. We scraped the pots every night. We all lost weight during the trip. It was all high adventure, because we were all kind of barely skilled enough to get through. We got through, but the river is a forgiving force. I still basically hadn't the slightest idea what I was doing down here. I was still trying to figure out what the questions were. If you don't know what the question is, you can't figure out how to answer it. But I thought I'd be working on sandbars.

I did another trip later that year with Tim Whitney on a riverbed sampling trip and then went back to Johns Hopkins University and wrote a research proposal. It was funded through GCES, and I moved to Tucson in March of 1985 and launched my own research trip in May of 1985. And again, at that time what I was going to study was how the sandbars had changed, and what caused them to change, and why the pattern of change seemed to be erratic because there had been a publication out in that same year which basically contended that the net result of the high floods had been that some bars eroded and some bars degraded and that the pattern was kind of haphazard. I was skeptical that the pattern was haphazard, and that all you could do was throw your hands in the air and say, "Some sandbars go up, and some sandbars go down." So I was going to go out to all the profile lines. The topographic surveys had been established by Alan Howard and Bob Dolan in the 1970s, and Stan Beus at the time was repeating. I was going to do detailed geological and river pattern/river flow studies at those sites to see what was the same and different about each one of those sites.

So I went up to Lees Ferry, I was training some people how to survey, we were going to do excavations, and 24 hours before I launched, somebody came up to me in the Marble Canyon Cafe and said, "Oh, by the way, the river discharge tomorrow is going to be increased from 25,000 cfs to 48,000 cfs." So I launched on my first trip that I was going to do on my own with essentially no notice that every study site I was going to work on was about to go underwater—and everything I was going to do on that trip was right out the window. So I had to instantly sort of think through, "Now what do I do? What's the plan?" which included just packing the pickups up and driving away and saying, "Well, I guess there's nothing to do in Grand Canyon." But that certainly isn't very much fun. Clearly you can't put your tail between your legs and give up. I had to kind of think through—I didn't have all the gear I needed too, but I pushed off down the river and





*The crew getting ready to launch on the first Stanton Photo Re-Match Project trip, at Lees Ferry, 1991. L to R: Bob Webb, Jack Schmidt, Ted Mellis, Drifter Smith, Mimi Murav, Rosalee Winn, Tom Brownold, Ralph Hopkins, Tom Wise, Glenn Rink.*

collected data on velocity and river flow characteristics at critical sandbars when they were underwater.

To this day, the data that I collected on that one trip is probably the most valuable set of data I've ever collected. All of it was on aerial photos, mapping where the edges of the flow were, and where the eddies were. But everything kind of sank in by the end of that trip—the patterns of why sandbars are where they are in relationship to the eddy flow patterns, just how low velocity the depositional settings are of sandbars, even though the river can be roaring downstream out in the main channel. And I did all that with basically no notice and using movie cameras—throwing oranges and grapefruits into the river to kind of get the flow patterns and get velocities of floating objects. I'm continually forced to remember now what the river was like then, because if we have an experimental flood next spring, it'll basically look like what we had ten years ago. Still at that time in 1985, it was a controversial issue about whether or not to study the effect of floods on this river system, despite the fact that we were having floods every year. Every time we go off to a bureaucratic meeting we would argue about this stuff. The Bureau of Reclamation was trying very hard to keep

floods from being seriously studied, and the Geological Survey was generally unwilling to challenge the Bureau because all of the Geological Survey's money came from the Bureau. So, the basic idea was don't do anything to piss off the client. We pushed on with our studies and my own thinking has evolved over time. One of the big conclusions of the Phase One GCES was that a succession of big, clearwater floods was dangerous and harmful to the beaches. My own work reiterated and supported earlier conclusions of Nancy Brian and John Thomas, who had found that campsites had largely eroded in the upper end of the canyon, and we had more campsites below Kanab Creek, but that was kind of a "So what, that's not where we need them." My work supported those conclusions and I came out very strongly against floods because of those patterns, but I was wrong in the details of what I said. I was not careful to distinguish the long duration, clearwater floods back to back, to back to back years, that we had in the 1980s. When I used the word "floods" I just used it generally, and what I really needed to have said was that those kinds of high floods that occurred too often, for too long, at too high of discharge, were destined to strip sand out of this canyon.

That's how I got started and out of that came a dissertation and some research papers. Employment with the Geological Survey didn't work out, and I went off and taught at a small college in Vermont. I couldn't give up, I cared too much about all this and I was far too personally involved in caring about how this river was managed to give up my research program. No one in GCS or the Park Service or anywhere else would give me any money to support my research. So, for a couple years I came out here on research trips essentially funded by the tuition dollars of students of Middlebury College because I would talk them into doing an intercession research trip in Grand Canyon. In January 1989 and January 1990 I did these winter trips at which we surveyed campsites and I did it without any funding support. . . Park Service at that time said, "There is only one entity who does research in Grand Canyon, and that's Glen Canyon Environmental Studies." Since I couldn't get any money or cooperation from them it was a done deal. I could certainly get research permits, they would allow me a river research permit. That's how things went for a couple years. What I did to keep myself on the radar screen for a couple years was work as hard as I could to get scientific research papers out. Eventually there was a conference convened by the National Academy of Sciences in Santa Fe, in the early nineties, about what Grand Canyon research was all about. At that point, I was one of the few people who had actually published any research. That broke a certain log jam. It was a bit unusual that I would not be getting any support if I'd at least generated some research results. I began to eek my way back in. I can't remember in what year, but Duncan Patten, Senior Scientist for the Glen Canyon Environmental Studies, asked me to work with him and provide him technical advice on sediment and geomorphology research studies. Ever since then I have served in that capacity as essentially a research advisor to Duncan on sediment and research issues. I've become a bit more involved since then.

That's a ten year history.

I think that what's important in all that, is again, the perspective on what the big questions are here has moved dramatically in ten years. We've moved dramatically from the fact that we were only looking at power plant operations. Now, we are looking at whole river management. We have had tremendous fights about the role of floods, whether floods were something we were going to consider in the whole operating scheme. There are several of us in the scientific community who have argued for selected events of flooding to restore the river corridor, and those who have fought tenaciously against it. We shouldn't lose

sight of how far we have moved in ten years.

**STEIGER:** Where does this Stanton Photo Match work fit in to all this stuff?

**SCHMIDT:** The Stanton Photo Matches are one part of a large effort to reconstruct the environmental history of the Grand Canyon river corridor. To me, that work is fundamental. It's a fundamental part of trying to decide and figure how to manage Glen Canyon Dam today. It's important for us to understand that at *no* time in Grand Canyon's history has a river ever looked the same and remained static from one day to the next; or from one month to the next; or from one year to the next. So, things like the Stanton re-photography—and repeating the photographs of all of these wonderful people who have come on this trip—give us an opportunity to understand what the short-term variation in the old days used to be; of sand storage along the river banks, and the characteristics of vegetation. Once we begin to piece together what that history is we get a sense of what the dynamic nature is of the processes of this river in the absence of Glen Canyon Dam. We need to know that information if we're going to understand what a healthy, natural ecosystem really is in Grand Canyon. I think those results then are coupled with the day-to-day detailed process studies being undertaken by *other* scientists, that involve the physics and dynamics of river flow, sediment transport, and interaction with fish and vegetation. The biological, chemical, and physical laws that govern things like sediment transport don't change whether they operate in 1994 or 1954. We had gravity then, and we have gravity now. We need to calibrate those process studies against the interpretations of the past so we have some sense about if you put *lots* more sediment in this river system, how did it work and how variable, for instance, were the sizes of sandbars in the past? We think we have a picture, but without reconstructing history, we don't have any idea whether we might be right or wrong.

That's one whole part of why do all this. I think the other reason is from a practical management standpoint. We need to not only discuss changes in Glen Canyon Dam operations in relationship to how the dam was operated a few years ago; but we need to understand changes in Glen Canyon Dam's operation to restore a river system in relationship to the way this river *was* forty years ago [1954]. If we ignore the way the river was before the dam, then our perspective about what change is and what change is about, really is very different. Therefore, I think that the Stanton re-photography and all the other re-photography reminds us of what this river corridor used to look like. We need to lay that before the public, for the public



then to decide what kind of river do we want.

**STEIGER:** Would you tell me again what you told me [before we started recording], about this trip? Just about what it means to get all these people together?

**SCHMIDT:** Okay. I think that all of us who are down here in Grand Canyon today in 1994, who work associated with the Glen Canyon Environmental Studies Program in its *broadest* concept—and that’s the scientists, the guides, the volunteers, the cooks, the whole shebang, plus all the people in the outside world—the agency bureaucrats who run the different research groups, the leaders of scientific research programs, university faculty and students—we all care tremendously about how the dam operates. We’re all trying to get credible science completed that might have some bearing on how the dam is managed. As part of that, none of us can help but be exposed to some of the political intricacies that are associated with taking a very important dam and a very important National Park, and trying to reconcile management. We all also know that as part of that controversial and important effort, governmental agencies become crosswise with themselves. Environmental community becomes crosswise with the water development community; people fight amongst themselves as to who is going to control the water and the sediment. Grand Canyon is a wonderful place to have as your research area or to sit in an office somewhere and believe that you actually control this. “I control the river, I control the park, it’s my park, it’s my canyon, it’s my river.” You hear people say that. We’re all aware that these battles go on, it’s part of human nature. When you get down here, people get sucked up in the belief that, “I’m the person who’s going to save the Grand Canyon river corridor.” One of the things that I’ve been reminded of on this trip by the old timers, is how self-centered that view is, how naive that view is, how completely out of keeping with Grand Canyon is any sense of that. These people, as I sit and visit with them at night and on the boats, I’m reminded that the value of Grand Canyon is far beyond any scientific enterprise. Grand Canyon is a spiritual place. Grand Canyon is a place of awesome beauty that affects every human being in a different way. Grand Canyon is a place of high adventure. How do you look downstream at this view we’re looking at with sun coming over the Kaibab rim and delude yourself into thinking that some piece of science, which is a little, tiny look at the natural world, equates with what we look at? What we look at is indescribable. These people who are with us on this trip could care less what agency or what little governmental group is controlling this river. They know that no governmental agency controls it. These people know

that the only thing that really matters is, in terms of environmental management—what are the real world changes, and what water and what sediment comes past the dam? They don’t care which governmental bureau does the science or funds the research. All they care about is what are the real, on-the-ground changes. They want to know, “What are the *real* changes that you’ve made down here? Because that’s *all* that really matters to the river.” We all need to be reminded of that. I only wish that this group of people on this river trip could share their experiences with the people who attend the cooperating agencies meetings every three months, or the EIS Team, or the National Park Service management, or the management of the Bureau of Reclamation offices in Salt Lake City and Flagstaff. These are the people you need to get, down here. These are the people we need to learn from, and all of us need to be humble enough to realize that this place is fundamentally a place of high adventure and good experience.

**STEIGER:** Ok! Sounds good.

**SCHMIDT:** I don’t know what the question would be, but let me take a second to spell out what I think is a fundamental management decision to be made down here. I agree that Glen Canyon Dam is a fact, and that in our lifetimes Glen Canyon will continue to exist as a dam, and it probably will continue to exist for hundreds of years. I think the decision we have before us is a decision about whether to use as the standard of environmental management on this river—the way the river corridor used to be—or the way the river corridor *is*. Steve Carothers and Bryan Brown I think *very* convincingly argue in their book, *The Colorado River Through Grand Canyon*, that the Colorado River is what they call a “naturalized” river. Not a natural river. It’s a naturalized river because it has natural processes, but those natural processes are not the processes that *used* to exist in Grand Canyon. The new processes are: a clear, cold stream; biological productivity that is produced *within* the channel, as opposed to brought in from upstream; a rich, and abundant, riparian, ecological community that supports a far more diverse array of critters than ever existed in Grand Canyon before, and is now the home for some threatened and endangered species that are looking for homes from elsewhere; smaller sandbars, but a useable number of sandbars, and a set of sandbars that also serve as substrate for tamarisk marshes and everything that depends on it; and a river that fluctuates from year-to-year far less than it ever did.

My reading of Carothers and Brown is that they argue that is the value we want to manage for the future of Grand Canyon. We need to say, “This is a



Jack and his dog Lily on the beach at Swazey's Rapid, Greyc Canyon, Green River, October 2012.

wonderful, scenically beautiful set of rock and slopes, and thank God we can't screw that up, except for the airshed." In terms of the river channel and things that live just off the river channel, we ought to accept this and celebrate this place as a transformed trout stream that's just warm enough to support humpback chub at the mouth of the Little Colorado, maybe in a few more places. We ought to celebrate what a much more rich, diverse, biological place this is. Those are the objectives we want to manage. Essentially, we've got a little bit less of a few things from the past, and the whole lot of new things we never had before. Bruce Babbitt, in his introduction to that book, says, "Those who would dream of returning the river to the ways of the past, who would propose ideas like passing sediment around the dam, are people who live in a dream world of changes that will never be made. What we need to do is celebrate this river for the way it is." To me, that's a very solid, intellectual, and rational argument. But in 1994, I'm *not* willing to take that as gospel truth, despite my respect for each one of those individuals.

**STEIGER:** We better wrap this up, they're waiting on us.

**SCHMIDT:** The contrasting view—which I am much more sympathetic towards—says we need to remember what this canyon was like before the dams of the Colorado River system were built—that the Grand Canyon river environment was a fairly harsh place dominated by bedrock, talus, sand, and water. And that there are other places on the planet in which to celebrate biological productivity in arid environments, but this isn't one of them. If that comes as part of the deal, so be it. But to me, what we want to understand is how this river functioned before there were dams, and we want to restore just those processes. And so to the degree that we can reintroduce big floods in this system, we ought to. To the degree that we can reintroduce sediment into this river system, we ought to. If there are biological communities that never used to be in Grand Canyon, and that now have adapted to the steady flows that exist here now, and those communities would be jeopardized by reintroducing sediment





Deployment of GCMRC staff to measure controlled release, November 16th 2012. USGS photo.

and floods, then I would argue that sediment and floods are more important than protecting new ecological communities that are adjusted to much more steady flows of clear water. I would argue that we can't have it all in Grand Canyon. You cannot manage this river for trout, for riparian marshes along the water's edge, *and* manage this river for big, open abundant sandbars. What I want to argue for is—the big, open sandbars were a fundamental part of the landscape of Grand Canyon. They were a fundamental part of the landscape every bit as much as the Coconino Sandstone is; every bit as much as any other rock formation. When I sit around the fire with these folks on this trip, virtually everyone remarks that one of the things they loved about Grand Canyon was its big, open sandbars. When I first started running rivers I heard about Grand Canyon. Grand Canyon is a great place to be, it has big, gigantic sandbars. Yes, that's convenient and nice for camping, but it's also part of the landscape. I think we've gotten ourselves into a difficult circle here, we've argued that the function of sandbars is just because it's a nice place to camp. Then you report that to somebody who lives in Nebraska, and you ask them, "What value should we manage Grand Canyon for?" You say to them, "Endangered birds, or

sandbars for camping?" People will always pick endangered species, and that makes sense when you describe it that way. To me, the loss of the big, open sandbars of Grand Canyon is no less a loss than if someone were to propose to us, "Well, what if we just take a five-hundred-foot slice out of the rock? Say the Coconino Sandstone? I mean you've still got the canyon, it's going to be a little bit smaller, but hell, no one's going to notice if you just remove one of these layers." That's absurd. I think that when you stand at a high point like the Nankoweap overlook with Bob Rigg, and Bob Rigg looks downstream and says, "I can't describe to you how much this place has changed. When we stood up here in the fifties, there was nothing but sand along both banks of the river. Now I see gravel, and tamarisk thickets, and it's a very different thing." Yes, those tamarisk groves are biologically productive, but this landscape looks very different than it used to. The difference is something which is changeable. We can reinstitute those big, open sandbars. I think we need to. But the first thing we need to do is—we need to pose that management dilemma before the public. I'm willing as a scientist to lay those two decisions before the public, and in a good solid argument pose what I believe. Then if I lose the argument, so be it. I want to



understand the system, and if I lose the argument, so be it, because I also recognize that there is a compelling rationale to the argument others have made to manage this river for biological productivity. But what I fear is that that decision is not laid before the public. It is just taken as a given that there is only one way to manage this river.

I think it's high time that people stand up and articulate more clearly "What are the objectives?"

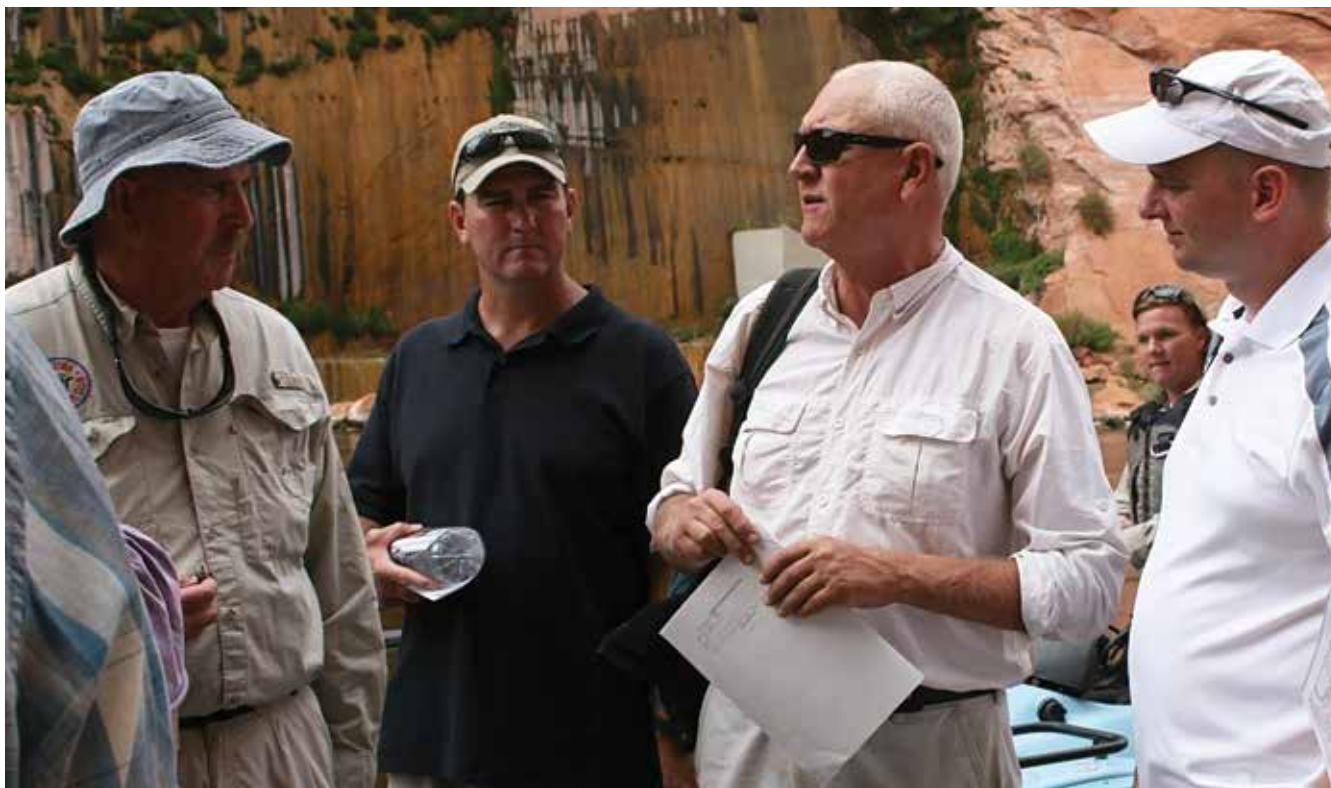
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We've taken ourselves [here in 1994] on a long journey for the last fifteen years on river management. That journey started [in 1979] with the proposals by the Bureau of Reclamation to uprate and rewind the turbines and move this system to 40,000 CFS high discharges, and much lower low discharges. The journey since then has taken us on this roller coaster of activism by the environmental community, activism by the outfitters, a negotiated settlement to substitute scientific studies as a sort of a buy-off, instead of agreeing to make some fundamental management changes ten years ago. Ten years ago, or twelve years ago, what went on here is what goes on in so many places in the world. Instead of making a tough decision right then, you say, "Well, let's pay to have some studies done, and we'll see

what those studies say, and then we'll make the decision ten years from now." Certainly we'll make better decisions in the future than we would have ten years ago, but it also allowed people to delay *making* tough decisions for ten years.

Ten years ago when I started working in Grand Canyon, I encountered tremendous cynicism on the part of the river guides community—I would say most of it justified. But the bottom line is, substantial cynicism ten years ago, that any of this research in Grand Canyon would mean or amount to anything; that this was, in fact, nothing more than a grand way to dump a whole bunch of money to buy off some scientists; and that the Bureau would just go on and do what it always had done. And the river guides community down here felt very powerless to change it. I probably never encountered a guide who said to me in 1984, "We're going to change things. We're going to make the Bureau of Reclamation change how they operate the dam." Instead, what guides said to me was, "The Bureau always does whatever it wants to. And heaven knows what your research is gonna show, because the Bureau will always do whatever it wants to."

I think in the *last* ten years, we've been on this ever-ascending scale of escalating scientific research—escalating money spent, escalating number of trips launched, escalating number of just raw numbers of



August 2012 on the AMWG Field Session Glen Canyon float trip. L to R: John Jordan, Technical Work Group chairman; Glen Knowles, Bureau of Reclamation; Jack Schmidt, GCMRC chief; and Jason Thiroit, representing the State of Nevada. USGS photo.



August 30, 2012 AMWGA "river dinner" at the Paria beach, sponsored by GICRGA. USGS photo.

people who work down here.

Somewhere in the midst of that, as the scientific work was just ascending, the river community and the river guides and the general environmental public *finally* began to see that there was a hope of things changing. And in some sense, almost divorced from the scientific effort, the public participation program began to bear fruit and culminated in the Grand Canyon Protection Act. I think what we have here in 1994 is sometimes what I would say is two different tracks: a track of continuing scientific research—and there are great differences of opinion about the appropriateness and about the scale of that effort; and then much more citizen concern now. Every guide—I think many guides and many people who come down here, now really believe that their opinions do matter. And so I think the first thing to observe when you say, "Well, what matters down here?" is: "Are the opinions of the people who find this a special place being considered?" I try as hard as I can in my own work to separate, or try to keep clear that part of me which is a scientist/data collector/conceiver of research ideas/implementer of those research ideas/and then interpreter of those data, to produce new insights into how the river system works. But I would be naive... For *me*, that's not all that I am, and that's not all of the opinions that I

hold down here. I've got another side, which is "What are the values that I have?" What are the values that I hold about this river corridor? And I have to work as hard as I can to separate those, because I can't let those values get in the way of interpreting the data. There are many times that I've had to say over time that I was wrong, opinions that I expressed in the past were wrong. But I dare say it's very hard for any scientist to spend a lot of time in Grand Canyon without developing a fundamental love for this place. And so I have my own values regarding what I think [is] important. But I think the *most* important one is the most general—and that's that no governmental agency, and no set of scientists ought to be the ones who establish what the values for this place are. Our job as scientists and agency people is to lay the decisions out before the public—including the river guides and the river passengers and visitors—and then it's all of us together as citizens of the United States who have to make the important decisions for this corridor.

I, personally, dream of a river system that functions as much like the river system that these people on this trip tell us was the river of old.

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## Photo Match

Upper South Canyon beach—Bryan Stone (NPS River) relocated the photo location showing the trail that the Katie Lee group used in 1956 (back page of BQR, Volume 25:2, Summer 2012). Check out the amazing difference in vegetation and beach sand after 56 years!



copyright Katie Lee 2012



Photo by Greg Woodall.