

## LIFE BEFORE AMWG

For the Adaptive Management Transition Work Group, April 19, 2016

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I'd like to talk about "life before AMWG", and offer some perspective on Grand Canyon river-running as an element of the LTEMP matrix.

By way of background, I had my first river trips on the Colorado in 1956, and have been a professional guide and outfitter since 1957.

For 7 years before the construction of Glen Canyon Dam. I organized and led commercial river trips in Glen and Grand Canyons.

In 1969 I organized and led a centennial retracing of Major Powell's 1869 descent of the Green and Colorado Rivers in wooden rowboats.

From 1978 to 1990, I was chairman of the Professional River Outfitters Association, the predecessor of present-day Grand Canyon River Outfitters Association. (Whose Executive Director is here today?)

I've written three books of river-running history, most recently: *Taking Big Red: The Colorado River-Grand Canyon Water War*, 1970 to 2016.

I don't presume to educate this Group on scientific or technical matters—This is more in the nature of story telling. If I get too elementary, please know it's because I'm drawing from my book, in which I've tried to explain and document the evolution of river and dam management for general readers.

The first year I went down the river through Grand Canyon, there were only four companies conducting organized and scheduled river trips. By 1970, there were 21. Today, as a result of a few mergers and acquisitions, there are 16.

By now, those companies have taken almost 1,000,000 Park visitors through Grand Canyon by boat. Grand Canyon River trip fares are presently \$43 million dollars per year and those dollars recirculate through the economy from 7 to 17 times, depending on whose computations are being used. The sixteen river companies employ several hundred highly trained pilots and guides, who are required to be skilled boat handlers, cooks, back-country guides, wilderness first-responders, interpreters, and psychiatrists. According to Grand Canyon National Park, we pay \$5 million dollars per year in franchise fees to the federal treasury through the National Park Service, as well as lot of other taxes and fees.

Besides about 18,500 commercial passengers per year, about 6,700 self-guided boaters run the Grand. There are also several livery companies that rent equipment and services to self-guided boaters. The exact annual value of those activities hasn't been compiled, but enough grab figures are available to also put it in the millions of dollars.

According to a 2012 study for Protect the Flows (a non-profit coalition of businesses that depend on the Colorado River), the businesses and employees who benefit directly or indirectly from "Colorado River recreation" earn \$10.4 billion dollars annually in salaries and wages.

In addition to those dollar values, there are also substantial non-dollar values, and non-use values, attributed to, and computed for, Grand Canyon river- running.

Despite those values, river runners are heavily overmatched in the competition for use of the river below Glen Canyon Dam. Unlike the basins, or the states, or the water companies, we have no water treaties, water rights, or water allocations.

I trace the beginning of this situation back more than 60 years, to the following actions and events:

**The purpose of Glen Canyon Dam was changed, and its generating capacity was increased**

The stated primary purpose of Glen Canyon Dam was flood control, but that soon became subordinated to generation and sale of electricity.

Early proposals were for an 800 megawatt powerplant.

- The authorizing legislation was for a 900 megawatt plant.
- When the dam was completed, it was name-plated at 950 megawatts
- When tested, it was found to produce 1,035 megawatts.
- In 1980, with 4 of 8 generators rewound, it produced 1,150 megawatts.
- Rewinding of the other 4 generators gave it a capacity of 1,336 megawatts.

Those modifications changed the peak release through the turbines from 20,900 cfs to 31,500 cfs. In a minute, I'll mention other modifications that have been proposed.

The generating cycle depends on lower lows to save water for higher highs. Low flows strand boats on shore, or ground them in shallow water for extended periods of time. In one instance a boatload of passengers was grounded in mid-river at Crystal Rapid for 40

hours – from Sunday afternoon until Tuesday morning. I’m sure you can imagine the restroom, meal-making, and sleeping situations that created.

Daily flow ranges and averages are often cited as measures, but those are irrelevant to river running: The daily range of 8,000 cfs is damaging if the low end of the range is 6,000cfs. And just as a person can drown in water that averages one inch deep, boats can be grounded or stranded by a release that averages 11,000 cfs, or even more, on a given day.

### **Changing the natural flow**

When the generators first went online in 1966, the daily peaking power cycles—one boatman called it YoYo water—created chaos. In narrow sections of the canyon, the daily cycle changed the depth of the river by some fifteen feet, leaving boats high and dry at attraction sites or overnight camps. Strandings and groundings disrupt trip and turnaround schedules; they disrupt travel schedules for our passengers—and they damage boats and other equipment.

### **Organizational restructuring**

For the first 10 years of hydropower generation (1966-1976), daily and seasonal discharges through the dam had at least resembled—in a broken way—the pre-dam pattern of higher flows in spring and summer and lower flows in fall and winter.

Partway through that ten-year period, the situation began changing. In response to the 1973 OPEC oil embargo, President Nixon called for a comprehensive National Energy Independence Plan. What most people probably remember about that period is its national highway speed limit of 55 miles an hour. In 1974, Congress passed the Federal Energy Administration Act. Between 1974 and 1978, propositions were developed for increasing the peaking power capacities of selected existing hydropower facilities.

In 1977, the spring releases from the dam were sharply curtailed—an abrupt alteration of the seasonal-release mimic. In mid-April, when the release was suddenly cut to 1700 cfs, 90 people who started downriver for “Easter” trips had to be rescued. Depending on where they were stranded, an emergency gush from the dam enabled some to get on down to Bright Angel beach, but others had to be lifted out by helicopter. Navigable flows weren’t released until the third week in June, so the first seven weeks of the river outfitters’ season had to be cancelled—about a \$2 million dollar revenue loss. The scuttlebutt was that the Bureau of Reclamation had used the water the previous winter to generate power they could sell in Wyoming instead of buying replacement power from fuel-fed generating plants.

During that year, the *Western Energy Expansion Studies* were released. Most of the propositions were for increasing the peaking power of existing plants by modifying their outlet works, rewinding existing generators and quickening their responses to demands. Glen Canyon Dam was one of the candidates.

On October 1, 1977, the Department of Energy was established. Two months later, WAPA (the Western Area Power Administration) was established within the Department as the Bureau's marketing and distribution arm for Glen Canyon hydropower.

In 1978, a customer organization, CREDA (Colorado River Energy Distribution Association) was formed.

In 1979, WAPA put forth its initial ten-year marketing plan.

### **The Erosion of Commitments**

In July 1979, the Bureau held a public meeting at the dam's visitor center to announce the beginning of a Glen Canyon Dam powerplant expansion study, and their intention to have their own study team supplemented by advisory sub-teams on power, biology, sociology, and recreation. About 25 people attended, and a number of us volunteered for each of the sub-teams.

During the remainder of 1979, and through 1980, the other sub-teams were convened and consulted several times, but the Recreation sub-team wasn't—until almost two years later. We formed an unofficial group and tried to get information and provide input, but without much success. Recreation's relative unimportance in the Bureau's process seemed to be reflected in the fact that, when the "recreation" member of their own study team left them in 1980, he wasn't replaced.

In February 1981, our unofficial group learned from one of the other sub-teams that the Bureau had obtained a draft report by Robert Dolan titled *Analysis of Potential Recreation Impacts due to High Water Releases from Glen Canyon Dam*. We also learned they were convening the sub-teams on March 17-18 to present information from the Dolan Report—and that April 1—two weeks hence—was the deadline for sub-team recommendations.

About 75 people showed up for the 2-day meeting. The Dolan study was based on release patterns the Bureau said would result from uprating the dam, plus their claim that they and the boaters had "a gentlemen's agreement" that the minimum release would not

go below 3,000 cfs during the 183-day river running season. There was no such agreement—and in earlier discussions, their volumes had been much higher.

On the second day of the meeting, the recreation sub-team was constituted. Because we had been sidelined for two years, we asked for a one-year extension of the deadline, and were given two months.

A few days later, the Bureau asked me, as chairman of the outfitters' association, whether there was a minimum flow level or pattern that would make the peaking power proposal acceptable.

I polled the outfitters. Their consensus was that most of the canyon could be run on 8,000 cfs, but a 12,000 cfs minimum was needed for the granite gorge. They were upset with the Bureau's 3,000 cfs minimum because, in its early presentations, the Bureau had deemed 18,000 cfs the minimum for rigid motorboats, and 7,000 to 10,000 the minimum for pontoons and hard-hulled rowboats. But in some sections of the river, lows of even 8,000 cfs were leaving boats stranded or grounded, waiting for higher water. Moreover they were angry that, during the five river seasons 1975-1979, the Bureau had dropped the minimum flow lower than 3,000 cfs on the average of one day in every three. In four of those years, the low was lower than 3,000 on 70 or more days of the 183-day season.

The peaking power expansion propositions were eventually dropped—but by 1981, the summer / winter release pattern had been substantially reversed, producing higher monthly releases in the colder months and lower releases during the boating season.

### **Proving a minimum flow**

In the spring of 1982, the Park superintendent and I arranged to take a group of officials down river from Hance Rapid to Dubendorff Rapid to demonstrate that 8,000 cfs was the bare minimum for smooth and safe river navigation. The participants included the Deputy Director of the National Park Service, the Park superintendent, the Commissioner of Reclamation, his Regional Director and environmental officer, representatives of WAPA, CREDA, the Arizona Game and Fish Department, and the Arizona governor's office. About twenty in all—enough to simulate a normal passenger load. During the experiment, the flows would be measured and timed at the dam and confirmed by USGS gagers at Lees Ferry and Bright Angel.

On weekend water, I took a 36-foot motorized pontoon from Lees Ferry to a beach just above Unkar Rapid. On Monday afternoon, three Park Service rowing rigs arrived, and the officials were brought in by helicopter. Overnight, the water level continued to drop, and the rangers and I had to get up several times to push the boats off the beach. By 10:00 a.m. it had bottomed, and we started downstream on 3,500 cfs, with the Park's rowing rigs in the lead.

Running over the ledges below Unkar on about 15 inches of water, the rowing rigs floated through, but the big boat scuffed the bedrock river bottom, paused, and nearly hung up—which noticeably startled the officials. When we reached Hance Rapid at noon, we found several small boats and about a dozen private boaters on the beach waiting for more water.

After bottoming for a while, the flow had begun increasing slowly. At 4:00 o'clock, the rangers decided to try running their rowing rigs through. We saw them take pretty hard hits in the bottom hole, so our motorized boat waited two more hours. Then, with just enough daylight to get to Bright Angel Beach, we ran through, also getting a jolt.

The next morning, the Bright Angel gager told us the previous day's average flow was 6,000 cfs and that we had, in fact, run Hance the previous evening on 8,000, with the Park rowing rigs having made it on 7,500.

Three weeks later (Tuesday June 15, 1982) thirteen motorized boats were stalled at the head of Hance Rapid by a flow of 7,000 cfs. During June and July, the Park recorded eleven boating incidents attributed to peaking power water, both high and low. They were about equally divided between commercial trips and private trips, and were composed of inundations, strandings, and injuries involving ankle, knee, back, shoulder, nose, eye, hand, and head. One very grim Incident Report mentioned a boatman's "broken face."

Those events did produce some important changes, but not soon. A few days after the demonstration trip, the Park Service and Bureau officials had a meeting. In July, Regional Director Barrett informed all the trip participants by letter that . . . "BOR is actively pursuing, at Secretary of the Interior Level, consideration to initiate detailed studies to determine impacts to Grand Canyon under present operations and proposed changes."

A year later, the midsummer 1983 emergency release resulted in many capsizes and one death at Crystal Rapid. Two months after that, the House Interior Committee

conducted field hearings at Needles California During the hearings it was argued that the 1983 emergency release occurred because water held back in Lake Powell to generate winter electricity occupied space needed to catch the April through July runoff.

In December (1983), the first Glen Canyon Environmental Studies project was established, and specifically instructed to focus on ecological and recreational issues related to Glen Canyon Dam operation, and not on economic or social issues. Commissioner Broadbent ordered the maximum release from Glen Canyon Dam limited to 31,500 cfs until long-term operating criteria for the powerplant were determined through the appropriate NEPA compliance process. At year-end, Interior Secretary James Watt terminated the Glen Canyon uprating campaign.

### **Redrawing boundaries**

In late 1983, with its ten-year power marketing plan scheduled to expire in 1988, WAPA announced its intent to revise the plan. Among the revisions was alteration of their marketing-area boundaries and the shifting of energy sales to what they called “northern region customers.” But by then had already made those changes—and they subsequently implemented their 1989 Plan without going through the NEPA process. Those actions resulted in their being sued on the basis that—because Glen Canyon Dam was not constructed either solely or principally for the generation of hydroelectric power—any plan to market Glen Canyon power must consider non-power values, meaning environmental and recreational values.

### **The result of those factors was an increased emphasis on Science and Research**

The hydropower interests complained about the 1983—1988 Glen Canyon Environmental Studies concerning itself only with environmental and recreational consequences of dam management. In 1989 Secretary Manuel Lujan established what became known as GCES II.

GCES II posed six scenarios for dam operations, each to address one or more critical resource. River runners were elated that river recreation was again identified as a critical resource. At the same time, some were upset because so many researchers were on the river that all the good campsites were being taken. In 1991, research trips took 18,500 user days, half-again larger than the largest outfitter’s concessioner allocation. Shortly after mandating GCES II as a 5-year program Secretary Lujan shortened it by three years, and ordered Interim Flows until an Environmental Impact Statement on Glen Canyon Dam could be completed. The Glen Canyon Environmental Studies became the progenitor of the not-yet-foreseen AMWG.

Because Glen Canyon dam was built and generating hydropower before enactment of the 1970 National Environmental Policy Act. 1970, those phases were not subject to the NEPA process. After 1970, application of the NEPA process to dam management was repeatedly dodged.

In 1992, as a result of years of conflict and lawsuits, Congress passed the Grand Canyon Protection Act. Although it required completion of a Final EIS on long-term operation of the dam, and protection of Glen Canyon and Grand Canyon, the Act also incorporated an Exemption Criteria MOU, drawn up by WAPA and Reclamation, which allowed the dam to be operated outside the Act in certain circumstances. WAPA also asked for, and subsequently received, a revision of the Draft EIS that would increase the maximum allowable flow from 20,000 cfs to 25,000 cfs and the ramping rate from 2,500 cfs per hour to 4,000.

### **Adopting Adaptive Management**

In February 1995, the Bureau formed a 19-member Monitoring Group to oversee conversion of dam operations from Interim to Long-Term and from the Grand Canyon Environmental Studies group to another entity. Shortly after that, an external meeting was called to select stakeholder representation for a Transition Work Group. More than 60 signed the attendance register, and many in the monitoring group became the Transition Group. Two years later (1997) AMWG—the Adaptive Management Work Group—was established, followed by formation of this Technical Work Group—and a Science Center that was initially called the Grand Canyon Observatory and later named the Grand Canyon Monitoring and Research Center.

### **LTEP and LTEMP and 30 Desired Future Conditions**

During the most recent twenty years, long-term experimentation was the focus of Adaptive Management. Now that has been modified to combine experimentation and management, and the challenge is to fairly address 30 Desired Future Conditions.

As mentioned at the beginning, a series of events and actions have both eclipsed Grand Canyon river running, and repeatedly reiterated its economic and social values. I hope adaptive management, and the increased emphasis on research-based river and dam management, will lead to a fair balancing of hydropower interests and recreational interests.

We river runners don't presume to claim that floating down the river is more important than having the lights go on, but we do claim that both are important in different ways.

I know all river boaters highly appreciate the work this group, and their parent group, has done, and will be doing. I personally would like to see a Preferred Alternative that would identify ways at least some of the summer releases could be returned to summer, and the low flows during the river season could be a solid 8,000 cfs or more, rather than an average of 8,000.

Thank you.