

The pursuit of knowledge—respecting the canyon
by Cristina Buss

Studying human impacts in the Grand Canyon has one inherent caveat: to observe the effects of man-made phenomena we studied such as Glen Canyon Dam, the white-water industry, the trout fishery, and controlled flooding, you must once again disturb the canyon to get down into it where you can clearly observe any changes that have occurred. This conundrum is true for any scientific endeavor. By observing any variable, reaction, or situation in order to better understand it, you accept the possibility that your observations may alter its natural state. There are many ways to get around this philosophical problem; scientific research is obviously commonly conducted, often with astounding and seemingly accurate results. It is interesting to bring this discussion to the Colorado River, however, because when we study a delicate ecosystem such as that of the Grand Canyon, we must be even more aware of all the ways in which our actions could further alter it. This is a synopsis of some effects we may have had during our study time in the Grand Canyon, specifically on the new sand deposition from the November 2004 flood.

To speculatively anthropomorphize for a minute, if native canyon species could have their say, they undoubtedly would urge tourists and researchers to walk softly and minimize their impacts on the ecosystem around them. However, some species such as the humpback chub might simultaneously encourage researchers to study and recognize the human effects that are already causing their decline. It might be in a chub's best interest for research to be done to determine what negative effects Glen Canyon Dam has on the chub's population, so that attention could be given to their fight for persistence into future generations.

Our canyon trip was designed to study the effects of the November 2004 flood. A main focus of our research was to observe the deposition of new sand laid down by this sediment-laden flood, and to determine to what degree this new sediment is creating and maintaining backwater habitats. To analyze the new sand deposition, we used lasers to make elevation cross-sections at each of our research sites. Being aware of our surroundings, and trying to minimize our impact on the ecosystems we were studying, we attempted to avoid the more unstable parts of these sandbars. However, many of our research sites logistically also had to double as campgrounds. In the process of unloading and loading gear, and setting up camp, we definitely destroyed some of the more fragile layers of new deposition.



Figure 1. Footprints and gear along a layer of new sand deposition.

At many sites, we observed the top layers of sandbars lying at the angle of repose (basically, about to break off and be taken back into the river at the slightest touch). These observations are interesting, because if we concluded that the November 2004 flood had some positive effects because by rebuilding sandbars, can we expect these effects to be sustainable after observing such unstable conditions? We also saw the river scour new deposition away as the river's daily fluctuating "tides" increased. This scour wasn't directly caused by our research then, but was one part of the human effects on the Grand Canyon that had brought us to this study site originally.

Our guides were extremely protective of the canyon, and helped us strictly obey guidelines to protect the ecosystem. A few key measures taken were packing out all waste, avoiding walking on microbial soil, and not collecting any firewood except driftwood within twenty m of the river's edge. We did, however, trample some sandbars and crush some vegetation as we walked our cross-sections. For vegetation analysis, some samples were collected to be keyed. We looked for invertebrates in many tributaries, disturbing these clear-water ecosystems and collecting some of the animals. One of our methods for deterring presence of fish species along various lengths of the

river was fishing, and several of us caught trout, carp, etc. We phished for birds in order to see them and determine what species were present, but this undoubtedly caused stress to many of them. We noosed lizards and took pictures of frogs and toads in order to write these field logs. Overall, we tried to have as little impact as possible on the Grand Canyon ecosystem. However, our presence there inherently affected everything around us.

All of this comes down to a question of values—are our results and experiences worth any negative impacts we might have had on the canyon? We hope so. By reading our field logs and natural histories, and learning more about the management of the Colorado River, you are taking an active part in your ownership of the Grand Canyon National Park. In conclusion, if we reduced a few sandbars during our research, I believe it was indeed worth it, because after reading our work, I hope you will have gained the knowledge that there are sandbars in the Grand Canyon, that they create important habitat, and that we must find ways to effectively manage the remaining canyon resources in order to conserve this ecosystem.