

By Dennis Stone



## Fifteen Years in the Grand Canyon

If form follows function, it couldn't be better expressed than in the humpback chub. This bizarre-looking fish is a natural ergonomic expression, a body form pressed by time to keel through roiling red waters of the Colorado River. And there this olive, silvery-white minnow lived naturally, from about the present-day edifice called Hoover Dam, upriver through the Grand Canyon to the Green River in Utah and Wyoming. This fish lived in anonymity, unknown by science until 1946. By 1967, it was endangered with extinction.

Biologists knew very little about the humpback chub until recently, our dearth due mostly to where it lived – far removed in remote, turbulent waters. Much remains to be learned. But this we do know: the largest of six remnant populations occupies the Colorado River below Glen Canyon Dam within Grand Canyon National Park, and the lower end of its Little

Colorado River tributary on the Navajo Nation in Arizona.

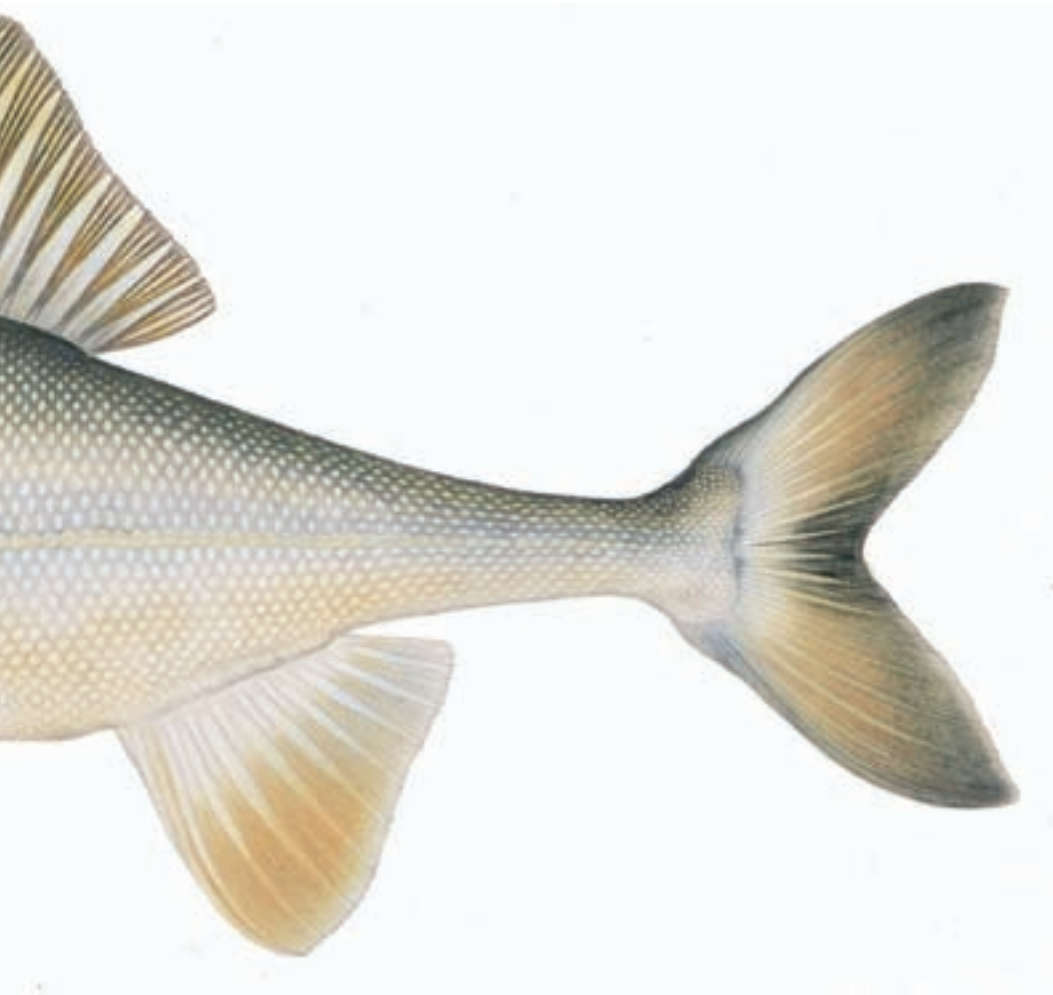
The U.S. Fish and Wildlife Service in the early 1980's studied the ecology of wild humpback chub in the Grand Canyon at a time when any information was new information. Willow Beach National Fish Hatchery also took a close look at their temperature needs, and what it takes for them to spawn and for the larvae to survive.

These two paths of inquiry brought us to our current understanding of humpback chub in Grand Canyon and they converge at this: cold waters released from the bottom of Lake Powell by Glen Canyon Dam are too cold for humpback chub. The unusually low water temperature inhibits spawning and embryonic development. Humpback chub that do survive there compete for food and space with non-native fishes that have come to dominate in these unnatural river conditions.



George Andrejko/AGFD

*Colorado River, Grand Canyon National Park.*



Joe Tomelleri

Glen Canyon Dam isn't going away anytime soon. Therefore, the perpetuation of the entire humpback chub population currently depends on the lower Little Colorado River for spawning and juvenile rearing habitat – and ultimately to recruit more adults. Native fishes still dominate the Little Colorado River, and young humpback chub commonly migrate from there into the Colorado River. The Little Colorado River is, after all, the least disturbed tributary of the entire Colorado River. It serves as a model stream to study native fishes under near natural conditions.



Some people take a bus to work, others car-pool. We go by helicopter or white-water raft. It's February 1993; in the span of a day, I go from the security of unemployment to a vaulting helicopter ride into the flooding Little Colorado River with

my first day on the job. Either as an initiation or a gross display of my naiveté, my new field boss offered me to an Arizona State University biologist to help retrieve some of his hoop nets, set to collect humpback chub. This guy handed me a backpack containing a five-gallon bucket to hold live fish from the net, and told me to swim across the flooding river with him. Foolishly, I did. The open bucket immediately filled with water and I began flushing downriver like flotsam. A quarter-mile later I reached the other bank, luckily still breathing. Thus, I was initiated into Grand Canyon fisheries research with a near-drowning experience.

It takes a helicopter to get to work in the Little Colorado River; for those studying humpback chub in the Colorado River it takes a literal white-water rafting expedition, some lasting 18 days long. Most of my helicopter rides were uneventful, highly pleasurable experiences;



Dennis Stone/USFWS

*Helicopters transport biologists into the Grand Canyon.*



USFWS

*Biologists raft the cold Colorado River to estimate fish populations.*



George Andrejko/AGFD

*The humpback chub is built for life in fast water:*

however, there were a few flights where the wind gusts bounced the chopper around like a ping pong ball. On one occasion a wind shear literally threw the chopper down, then sideways, for a dicey moment.

Rafting through the major rapids of the Colorado River always exhilarates, and it's not nearly as dangerous as flying. Most of the

boatmen have hundreds of river trips under their belt, and historically, very few people wearing life vests have ever drowned in the Colorado River. Perhaps another gross display of my naiveté proved the point. I was once talked into swimming Hermit Rapid with my life vest on. Although I wouldn't exactly call that a pleasurable experience, it did ease my concerns over someday flipping a



Pam Sponholtz/USFWS

*Biologists walk the Little Colorado River.*

raft, especially given that we conduct nighttime electrofishing surveys or pull trammel nets suspended on floats while boatmen navigate the tumult by spotlight, headlamp or moonlight.

The perils of the Grand Canyon come in other forms. I've seen numerous people in extremely hot weather soak their night clothes or sheets in water so that they can sleep, only to wake with a full-body diaper rash. One guy soaked the ground before sleeping on it, only to be eaten alive by the red ants he drew in. Inescapable summer monsoonal thunderstorms plague our work with lightning and winds like a hurricane. You're always sharing your camp with an assortment of undesirable critters. Antihistamines do wonders for counteracting the effects of scorpion stings. Although mice urinating and defecating all over your table, stove and other stuff is disconcerting, what I find most disagreeable is waking when they lick the blood of my wounds. Once, a volunteer went to his tent for the night, zipped it up, and woke up later to find that he had trapped a skunk inside with himself.



Over the past fifteen years I've participated in myriad fishery studies throughout the Grand Canyon. The Arizona Fish and Wildlife Conservation Office where I work, now primarily conducts semi-annual



George Andrejko/AGFD

*An Arizona Game & Fish biologist scans a fish for tags.*

population estimates of the adult humpback chub in the lower nine miles of the Little Colorado River below Chute Falls. Chute Falls is a presumed fish barrier to upriver fish migrations, and we moved young humpback chub over the barrier, hopefully to extend the range of this species. So far, they are doing well.

The status of humpback chub is precarious, at best. The adult humpback chub population of the Little Colorado River accounts for most of the total “Grand Canyon” population. Its numbers there declined by about half from 1989 to 2001. That was followed though, with a quick 25-percent increase by 2006, and they are still rising in number.

Obviously, something changed. The answer centers on habitat.

A protracted drought lowered Lake Powell to a point where Glen Canyon Dam released warmer waters that in turn created habitat for native fishes. It also made the waters less favorable to the competing non-native rainbow trout and brown trout. This same drought reduced the severity of floods occurring in the Little Colorado River, improving conditions for successful humpback chub spawning and survival to adult size.

We have learned that removing non-native fish relieves some competitive pressure on humpback chub. Moreover, scientists continue to evaluate the value of modifying the intake structures that would release warmer water from near the surface of Lake Powell. Work progresses for the purpose of benefiting the river’s imperiled fishes so that more of them can swim the roiling red waters. ♦

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Pam Sponholtz/USFWS



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*Dennis Stone looks for chubs below Chute Falls.*