DON BRIGGS

The Tuolumne courses through the Sierra: the object of the first big conservation battle and now a major test case

ENVIRONMENT

The Battles for a River

The Tuolumne is a river of some distinction. Emerging from Yosemite National Park, it makes a 158-mile plunge through the Sierra Nevada into California's San Joaquin Valley. There is top-rated white water along the river and pristine canyons around it. But perhaps its greatest distinction is historical: In 1913 John Muir and the Sierra Club lost the nation's first major conservation battle when Congress allowed San Francisco to dam the upper Tuolumne and inundate the Hetch Hetchy Valley. Now the river is once again getting national attention. And again the cause is a classic environmental battle.

Last March the Federal Energy Regulatory Commission granted a preliminary permit to San Francisco and the irrigation districts of two Central Valley towns, Turlock and Modesto, for the $900 million Clavey–Wards Ferry Project, which would flood nine miles of Tuolumne white water behind a hydroelectric dam and dry up another nine miles each summer by using two dams to divert water into a tunnel.

The action became possible when a moratorium on development of the river elapsed last January. The ban had been in effect since 1979, when President Carter proposed including the Tuolumne in the National Wild and Scenic River System. Though the Interior and Agriculture departments also recommended setting aside 83 miles of the river, Congress never took up the issue. After the moratorium was lifted, engineers quickly revived a 1975 proposal.

Conservationists say more is at stake than the free-flowing lower stretches of the Tuolumne. Since 1981 there have been no additions to the Wild and Scenic River System. At the same time, the number of permits granted for hydropower projects has dramatically increased.

"The Tuolumne is a test case," says Chris Brown of the American Rivers Conservation Council. "What happens on the Tuolumne will establish an important precedent for other rivers in similar situations around the country."

Among those rivers, Brown says, are the Dolores in Colorado, the Gauley in West Virginia, and the Youghiogheny in Pennsylvania. All are popular whitewater rivers that have been considered for wild and scenic designation but have also been studied for possible development.

TABLES TURNED

Conservationists hope to save the lower Tuolumne by turning the tables and invoking the multiple-use doctrine of Muir's chief foe in the Hetch Hetchy battle, Gifford Pinchot.

With five existing dams, the Tuolumne supplies drinking water for 8 percent of California's population. It also irrigates 230,000 acres of farmland, generates 2,000 megawatts of power, and provides 35,000 recreation days annually. Conservationists point out that the Clavey–Wards Ferry Project would generate 400 additional megawatts, have no effect on water supply or flood control, and cripple recreational uses.

"The Tuolumne River of today is a hardworking river," says John Amodio of the Tuolumne River Preservation Trust. "Approval of the project would mean maximizing a single use—generating electricity—at the expense of the other uses."

River-conservation groups are still smarting from the recent loss of a decade-long battle to stop development on the nearby Stanislaus River. "Support for the Stanislaus didn't get organized until after the dam was built," says river guide Brian

Fessenden. "The support for this river is here, now."

But dam supporters are equally determined. Turlock and Modesto currently buy more than half their power from outside sources—chiefly from San Francisco. According to Robert Nees of the Turlock Irrigation District, this places his community in an "energy-deficient position."

"It's not a natural, wild river we're talking about," says Nees, referring to the river's controlled flow from the Hetch Hetchy Reservoir. "We're not going to damage the environment. The rafting won't be the way it is today, but there are other rivers to raft."

EATING CAKE

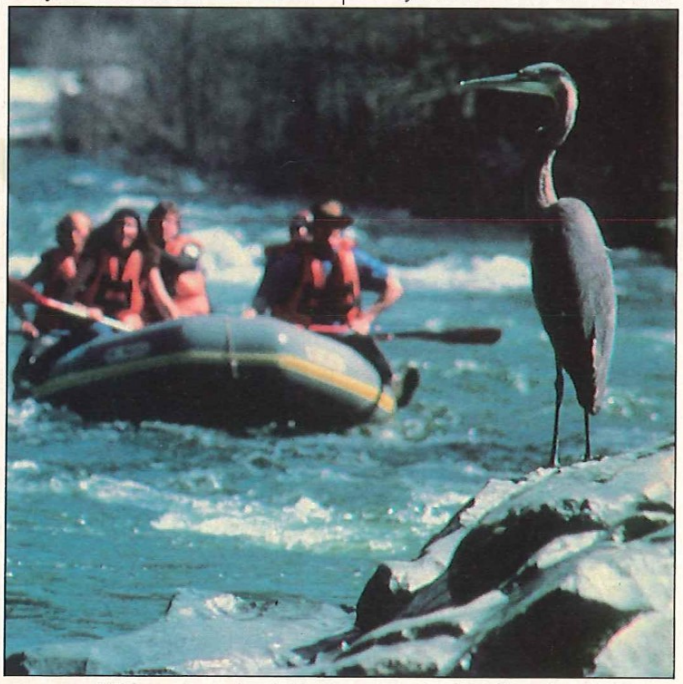
Conservationists point out that residents of Turlock and Modesto pay less than half of what most Californians pay for power. Furthermore, they say, the two towns have exaggerated their projected need for electricity.

San Francisco is certainly not short on power. The city earned about $75 million last year from the sale of surplus electricity (much of it generated by Hetch Hetchy). For a time the city was in a quandary. "We want to have our cake and eat it too," admits Leo Bauer, project manager for San Francisco's Hetch Hetchy Water & Power Department. "There was a feeling that it'd be nice if the river weren't developed, but if it's going to be anyway, we would look pretty foolish to pass up some $40 million in revenues."

But in a surprise move last June, the San Francisco Board of Supervisors unanimously passed a resolution supporting the designation of the Tuolumne as a national wild and scenic river.

"For the first time, a major city has taken a bold, ethical position on an environmental issue that conflicts with its economic interests," says Amodio.

Senators Alan Cranston and Pete Wilson of California will hold hearings on the Tuolumne and other areas being considered as wilderness areas in California. Under legislation now being discussed in Congress, the Tuolumne could be designated as either a wilderness area or a wild and scenic river. Conservationists hope for the latter; they say it might be the spark it takes to get other rivers included in the system. **—Gale Warner**



White water and pristine canyons: a hardworking river

DON BRIGGS

NATURE

Waterproof Frogs

The northern foam-nest tree frog: He loves to sit in the sun and bake.

R.C. DREWES/CALIFORNIA ACADEMY OF SCIENCES

Frogs, as everyone knows from high school biology, are moist creatures; lovers of dank, damp places; dwellers of swamps and marshes. But herpetologists have recently discovered different kinds of frogs living in the deserts of Africa. Perhaps the most unusual of these is the northern foam-nest tree frog, a two-to-four-inch torpid animal that lives in the arid wastes of Kenya and Somalia. Chief among the tree frog's peculiarities is that it is almost completely waterproof. And that fact, scientists say, may have broad implications for humans—since we may be waterproof for the same reasons.

"You have to forget everything when you study these guys," says Dr. Robert Drewes, head of herpetology at the California Academy of Sciences in San Francisco. Drewes and colleagues from Portland State University in Oregon have been studying the frogs, whose scientific name is *Chiromantic petersi*, since the early 1970s.

In desert areas, most frogs seek the coolest places possible—burying themselves underground or hiding beneath rocks. Unless they find shelter, they quickly lose their body fluids through evaporation. Not so the African tree frogs, which instead of getting out of the sun will just sit and bake in it. Two factors seem to help them retain their body fluids: They excrete waste in a solid form, as do birds and reptiles, and their skin won't allow moisture to escape.

How the frogs have achieved their waterproof skin is still a mystery. "We thought they might wipe themselves with a waxy substance like a species from South America does," says Drewes, "but they don't."

Instead, Drewes thinks the answer may lie in the discovery of something akin to laminar bodies—the structures in human skin cells that make us water repellent. "It was only a few years ago that we found out what makes *us* waterproof," says Drewes. "Now we're looking for these same structures in frogs."

Drewes says such a discovery would have an impact on our ideas of evolution. "Frogs are some of the oldest creatures on Earth," he says. "To find a structure that we share with them would be incredible."

—Virginia Morell