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YOSEMITE NATIONAL PARK UNDERWATER WONDER

**If there someday is a will, a way to
reclaim the Hetch Hetchy Valley has
been devised**

- [Glen Martin, Chronicle Environment Writer](#)
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It has been more than 80 years since the Hetch Hetchy Valley disappeared under the waters gathered behind O'Shaughnessy Dam, but its lost High Sierra splendor still resonates with nature lovers. John Muir called Hetch Hetchy the "wonderful exact counterpart" to Yosemite Valley; old photos and narratives bear him out.

It is a valley about 9 miles long and 1 mile wide, ringed by granite walls and spires towering 2,000 feet. Before the dam, the Tuolumne River tracked through the valley floor, past verdant meadows and copses of black oak and ponderosa pine.

When the valley was inundated in 1923 to provide water to San Francisco, it was assumed it would remain submerged forever. But two months after a Bay Area environmental organization announced a study supporting the restoration of long-drowned Hetch Hetchy Valley, the idea has gained a degree of momentum.

A recent study by the group Environmental Defense indicates the valley could be resurrected, with water needs met by transferring water to Don Pedro Reservoir and building additional infrastructure. The study, which estimated it would cost between \$500 million to \$1.6 billion to expand water storage facilities below Hetch Hetchy, augments earlier analyses by UC Davis and the U. S. Department of Interior, both concluding that restoration was possible without threatening state water supplies. Earlier this month, the Schwarzenegger administration announced it was authorizing a state study to evaluate restoration scenarios.

Still, there are major obstacles that could prevent implementation. Even if the state gets behind the idea, officials in San Francisco -- which owns the dam -- and other Bay Area communities that get their water from Hetch Hetchy will need convincing. San Francisco Mayor Gavin Newsom and San Francisco Public Utilities Commission general manager Susan Leal have been tepid at best to restoration proposals.

The National Park Service -- which would manage the valley if it is restored, because it lies within the boundaries of Yosemite National Park -- is resolutely neutral on the issue.

In any event, a looming question remains:

How do you do it? How do you bring the valley back from the depths?

First priority: drain the reservoir. This could be largely accomplished by simply punching a big hole at the bottom of the dam, but complete or partial dam removal would be aesthetically preferable, say the project's supporters.

"The downside is that there will be some noise involved in the removal, and it will take up to five years," said Ron Good, the executive director of Restore Hetch Hetchy, an ad hoc group promoting the project. "The good thing is that the dam can be removed in a way that is both environmentally responsible and economically sound."

Good called the dam itself a treasure trove of valuable resources.

"All that concrete and steel rebar can be recycled," he said. "We estimate its worth at about \$9 million, revenue that can help with the restoration," which, he said, is expected to cost between \$10 million and \$20 million.

Ann Hayden, a water resource analyst for Environmental Defense, said demolition would have to be timed so it wouldn't interfere with the nesting season of the area's peregrine falcons. It might also be necessary to retain a portion of the dam as a water diversion structure, Hayden said.

"We know there was some excavation of the dam site during construction, so we might need to keep part of the dam to maintain the river's natural gradient," she said. "And that wouldn't necessarily be a bad thing. The dam is part of the valley's history, and a surviving segment would have educational value -- a symbol of something that shouldn't have happened."

With the dam gone, the valley would bear little resemblance to its former state save in the most essential geologic terms.

"It will basically be a moonscape," Good said. "No vegetation obviously, but not even any dead standing trees or logs. Just stumps. The city of San Francisco paid contractors \$50,000 to cut all the timber in the valley before the reservoir was filled."

Hetch Hetchy restorers would not have to contend with a problem that has confounded plans to restore other inundated canyons and valleys: massive sediment loads. Because Hetch Hetchy drains a pristine granite basin, analysts think there would be little if any sediment to address.

"Maybe an inch, maybe a couple of inches," said Hayden. "That's a real plus for a project like this."

With the reservoir drained, the Tuolumne should return to its natural channel. At that point, the priority would be stabilization of the river's banks to prevent extensive erosion, said Mark Cederborg, the chairman of the restoration committee and a project manager for Hanford Applied Restoration and Conservation, a Sonoma engineering firm that specializes in ecological remediation.

"Often, concrete rip-rap is used for that purpose, but that obviously wouldn't be a popular choice," said Cederborg. "We'd rely heavily on willow and cottonwood plantings to stabilize the banks."

Reseeding 1,200 to 1,500 acres of the valley's meadowlands with native grasses and forbs would soon follow. To prevent the encroachment of "exotic" plants -- noxious nonnatives such as yellow star thistle, ripgut brome and wild oats -- Hayden said this portion of the project should be done as quickly as possible.

About 17,000 pounds of seed would be needed, Cederborg said. That's a somewhat daunting amount, considering that native plants are parsimonious seed producers, but restorers have a couple of options. "The cheaper way would be to seed pockets on the valley floor with natives," Cederborg said, and then encourage them to spread -- but that would require a plan to manage the invasive exotics, which could flourish in the unseeded areas.

He prefers a costlier alternative: Harvesting seeds from nearby sites and planting them at a production facility. The resultant crops would be intensively managed for seed production, allowing the rapid accumulation of a sizable seed bank.

"For this approach, we'd need a lot of help from nonprofit groups," Cederborg said.

Along with upland meadows, the valley also contained extensive marshes and bogs. Re-creating these wetlands, said Cederborg, should be relatively easy.

"If you build the right kind of environment, we believe the appropriate plant species will come," he said. "We'd also augment the process by plug planting wet meadow species such as sedges, rushes and tufted hairgrass."

Restoring the valley's lush groves of oak and pine would come next. Because different tree species have different preferences in regard to soil type and microclimate, researchers are disinclined to jam seedlings willy-nilly across the valley floor. Luckily, a template exists to guide them -- the stumps of the trees cut prior to flooding. These stumps, say researchers, could serve as benchmarks for planting a new forest in the valley; oaks could be planted among the oak stumps, and pines among the pine stumps.

Within a couple of years, the valley would be greening up nicely, and the process should accelerate from there.

"In five years, wildlife would begin filtering back in," said Hayden. "In 10 years, the valley floor would start to resemble its pre-inundation state, and there'd be lush willow and alder groves along the river. Around then, you'd also start seeing native reptiles and amphibians. In 50 years, the boundaries of the plant communities will have stabilized."

One legacy of the valley's inundation would linger for a long time: The bathtub ring the reservoir left on the surrounding granite walls. It may take up to 80 years for water and lichen to scour the ring away, Hayden said.

But in 100 years, she said, there would be mature oak woodlands and incense cedars and ponderosa pines reaching 150 feet into the sky. To a large extent -- except perhaps for a crumbling fang of the old dam left at the head of the valley -- there would be little evidence that the Hetch Hetchy had ever been flooded.

"If we do it, people will be drawn from all over the world to witness the process, its evolution," Good said. "We'll literally be creating another Yosemite Valley. It's

unprecedented -- there's no other opportunity like this anywhere on Earth."

GRAPHIC:

Rebuilding a valley Once dismissed as lunacy, proposals to breach O'Shaughnessy Dam on the Tuolumne River and restore HetchHetch Valley are gaining some measure of social acceptance and political momentum. Advocates say the science of ecological restoration is now well understood. All it would take to return Hetch Hetchy to its former glory, they claim, is time and money..

Stabilize stream banks

To minimize erosion, the banks of the Tuolumne River will be stabilized using willows, cottonwoods, alders and structures fabricated from biodegradable materials. As the trees grow, they will serve as foraging and nesting sites for songbirds and raptors..

Mass reseeded

About 1,200 to 1,500 acres of the valley floor originally were upland meadows. Advocates hope to build a native plant propagation facility that ultimately will yield about 17,000 pounds of seeds, which could then be sown across the valley floor with modified grain drills..

Low-lying areas

Bogs, marshlands and wet meadows were once abundant in the valley. Researchers think such lowlying areas will revert naturally to wetlands. The process could be accelerated by planting plugs of sedges, rushes and other native wetland plants..

Trees

Though all the trees in the valley were logged prior to flooding, their stumps remain. These stumps will guide researchers involved in the valley's reforestation. Oaks will be planted in areas with oak stumps, pines in areas with pine stumps..

Dam removal

The first job in the restoration will involve breaching or removing the dam. If dam removal is the chosen option, it may be necessary to leave part of the structure to maintain the Tuolumne River's natural gradient. Restoration advocates hope to construct a conveyor system to transport the concrete and steel from the demolition site to staging areas out of the canyon, where it can later be sold.

– Glen Martin
 Tuolumne River Grand Canyon of the Tuolumne River
 Tueeulala Falls Wampama Falls
 Waterline of Hetch Hetchy Reservoir
 John Blanchard / The Chronicle
 Hetch Hetchy Reservoir

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