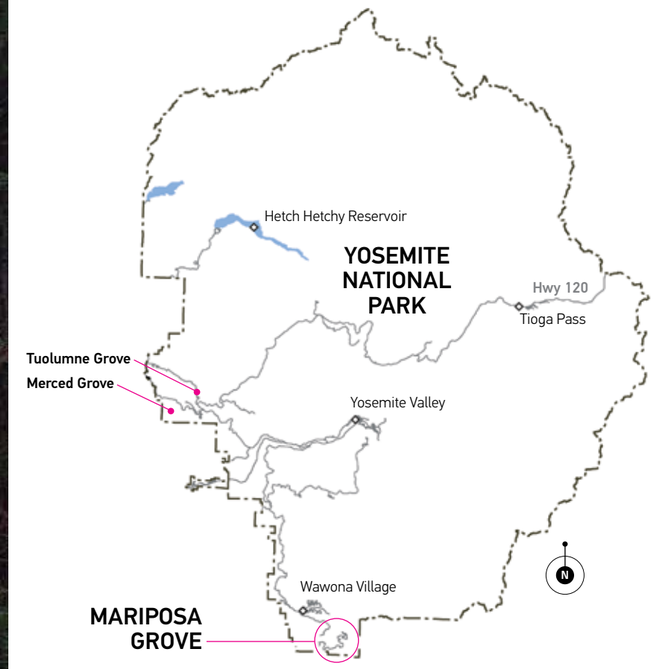
GIANT STEPS

IN YOSEMITE NATIONAL PARK, NEW VISITOR INFRASTRUCTURE NURTURES BOTH THE SPECTATORS AND THE SEQUOIAS.

BY JONATHAN LERNER

CHRISTIAN RUNGE, ASLA

FALLEN TUNNEL TREE
The mulched path to the left of this fallen giant sequoia used to be the road for the Mariposa Grove tram.



BELOW
Susan Olmsted, ASLA, with papers, and core NPS team members on an early site visit.

OPPOSITE
Strategic opening of views revealed the scale of the great trees.

JOSH HELLING

MITHUN, TOP LEFT; BRENDAN CONNOLLY, BOTTOM RIGHT

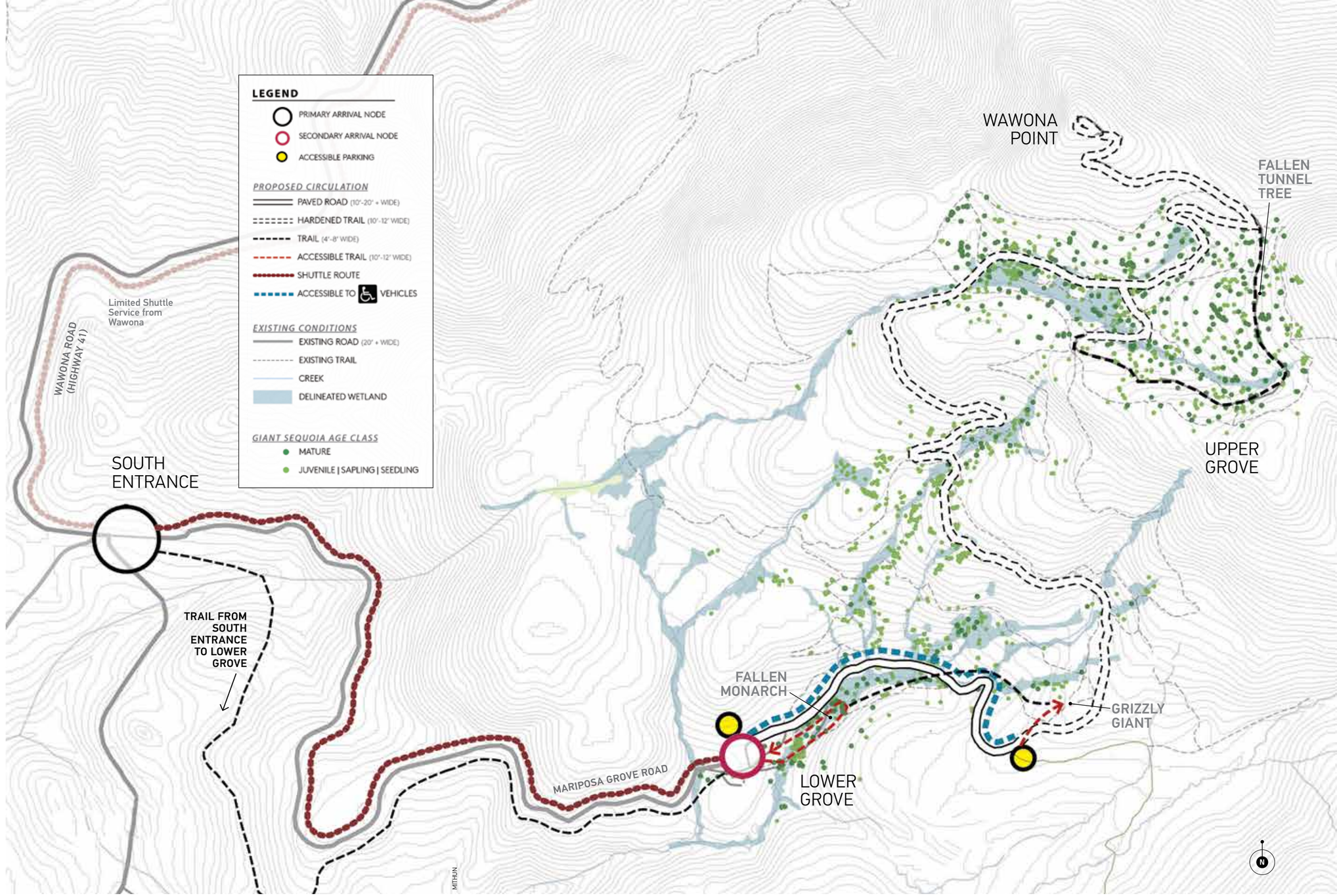
IF YOU VISIT ONE OF OUR NATIONAL PARKS nowadays to commune with nature, you may find yourself having instead an experience of mass tourism. Many parks are huge. You'd expect plenty of elbow room. But much of any wilderness park is inaccessible to the public. Besides, people generally head for a few famous spots—you probably want to see those too—which quickly become overwhelmed. Attendance is up over the past few years. Infrastructure typically went in over decades, usually piecemeal, not by comprehensive plan, and for smaller crowds, so both visitor experiences and the places themselves become degraded. And the National Park Service has money problems. By 2017, the bill for deferred maintenance—apart from any new capacity—was $11.6 billion (see "Roads to Ruin," *LAM*, February 2016).

Still, where it can, often with help from citizen conservancies, the park service is commissioning landscape architecture interventions to redress the gridlock and throngs. Most people will still find themselves among multitudes of strangers, but these redesigns can provide more authentically natural, less contrived interactions with the environment. The Mariposa Grove of giant sequoias in Yosemite National Park was until recently a prime example of the problem. A project there, which opened to the public last summer, is a model response. Half of its $40 million cost was donated by the Yosemite Conservancy. It was designed by Seattle-based Mithun.

Mariposa Grove actually has two concentrations of the great trees, the lower grove and the upper grove. Before, when you reached the lower grove you were in a parking lot. Several giant sequoias were stranded there like islets in the sea of asphalt; you might not even have realized you'd arrived. This lot filled up early. Overflow traffic returned some seven miles on a winding, two-lane park road to Wawona, where there is a historic hotel, a convenience store, and a small Yosemite history museum. Visitors there caught a shuttle back to the grove. But Wawona had only "a makeshift drop-off for the shuttle and no parking infrastructure for the hundreds who would come through—quite a fiasco," says Christian Runge, ASLA, a Mithun senior associate.

When you finally shuttled back to the lower grove, "there was a sense of confusion," Runge says. "Wayfinding wasn't clear. There were redundant loops of trails. They had to have rangers telling people where to go. We want rangers to be interpreting, not helping people find the damn trails." Pavements were disintegrating. There was no plumbing. "I think the number one complaint was the toilets, followed by parking and traffic." Visitors could ride a tram to the upper grove, but with "the trams coming through, tour buses dropping off, generators running—it was insane." As for accessibility, "it sucked to be here in a wheelchair. There was nothing at all except for getting out of your van and getting into your tram—which you had to pay for."

RIGHT
A hardened trail (double-dotted line) leading for three and a half miles from the lower grove to Wawona Point was formerly a paved road for cars.

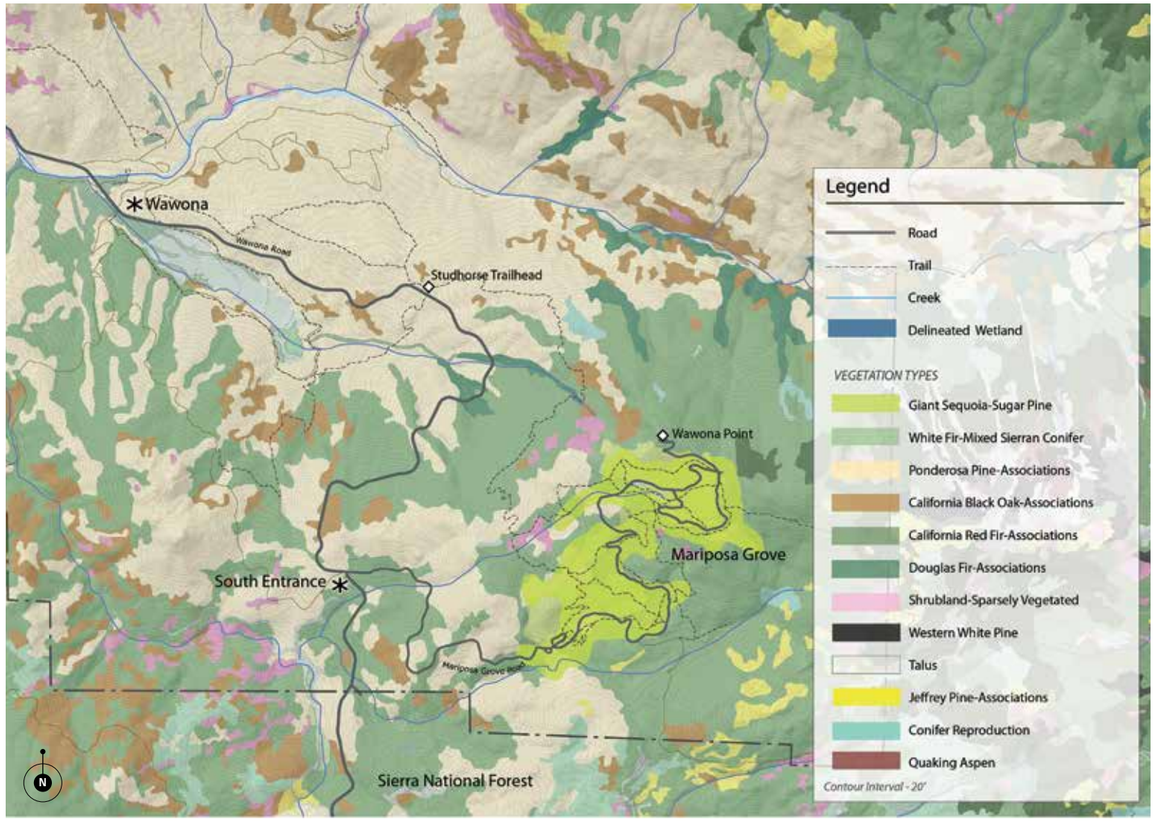


Worse, the giant sequoias were being harmed. Sequoias need a lot of water. A paved road from the lower grove wound for another three and a half miles through the upper grove to an overlook called Wawona Point, crossing an essential network of watercourses repeatedly. "Fingers of wetland streams were being interrupted by culverts that were blocked. Some were actually diverting water out of the natural watershed," Runge says.

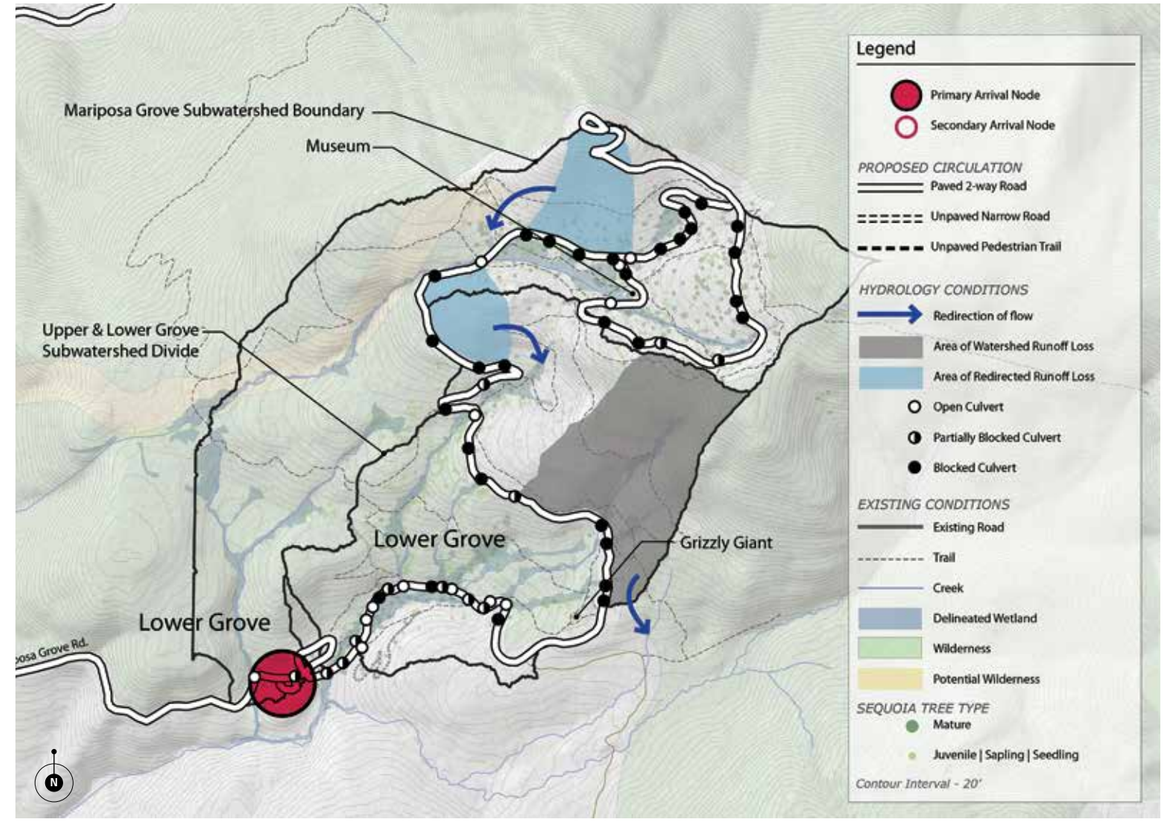
Visitors were affecting the trees as well. Sue Beatty, a restoration ecologist who recently retired from the park service, says, "We were seeing a lot of soil compaction around the trees from trampling, and soil being eroded away from roots. On some paths, people were actually walking on sequoia roots." Antique photos show carriages and cars driving through an opening hacked into the trunk of the Wawona Tunnel Tree at Mariposa Grove, which fell in 1969 and is now known as the Fallen Tunnel Tree. The tram didn't do that, but it passed closely enough between some sequoias to leave traces of its paint on their bark. "As the trees kept growing," Beatty says, "the road became more narrow."

There may be national park sites more Disneyfied and defiled, but Mariposa Grove has its own history of kitsch. An 1899 photo shows a cavalry

VEGETATION TYPES SYNTHESIS MAP



HYDROLOGY & ROADS ANALYSIS



ABOVE
Giant sequoia habitat is limited to west-facing slopes at the rain–snow transition zone.

OPPOSITE
Blocked culverts once interrupted the natural hydrology, even directing water away from the grove.

MITHUN

MITHUN

troop lined up atop the length and perched in the exposed, gnarled roots of the Fallen Monarch, which is among the first and possibly the most affecting iconic giant sequoia you encounter here. Tourists of that era took home "cabinets and glove-boxes, canes, tables and buttons carved of sequoia wood," a historian notes. This soaring forest is often likened to a cathedral. The analogy was ironically reinforced by the repeated touch of people's palms on sequoia trunks, which carved hollows in the bark—just as, at the Vatican, the toes of a bronze Saint Peter have been worn away by centuries of pilgrims' kisses and touches.

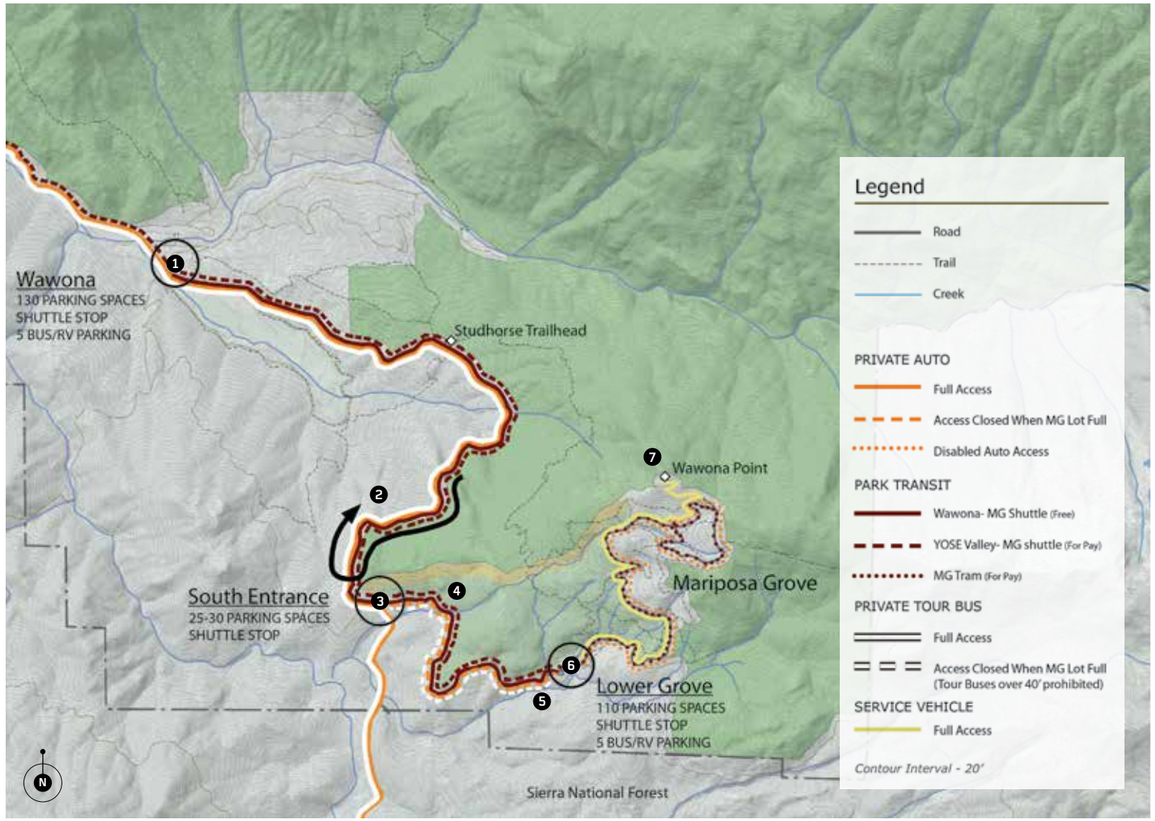
But reverence in the presence of these unfathomably huge and ancient living things is irresistible. So is appreciation for Mariposa Grove itself, once you know its history. It was first protected in 1864, before Yosemite was a national park. And Theodore Roosevelt's 1903 visit, guided by the protoenvironmentalist John Muir, surely encouraged his championship of conservation and wilderness; five national parks and 18 national monuments were established—230 million acres of public land protected—during Roosevelt's presidency.

Arrival at the grove has been completely reimagined. Now, just inside one of the main park entrances, but several miles from the giant sequoias, there is parking for about 300 cars. They are distributed onto three terraces curved into a slope and connected by stairs and accessible ramps. Restrooms, a shop, and the shuttle pickup are in a plaza at the top. "The grove on a peak day gets 4,000 people, so this is an urban condition," Runge observes. Shuttles arrive frequently for a 10-minute transfer to the lower grove; it's an orderly process. "For Americans that come here it might be the most time they ever spend on a bus, while there are so many international visitors now who might have a different experience of mass transit."

The shuttle lets you off at a wide plaza. This space narrows asymmetrically, with stopping points bumped out at its margins where individuals can, without tripping those following behind, step from the flow to regroup, listen to a guide, or simply catch their breath after their first glimpse of the towering trees. Many people aim for named sequoias such as the Grizzly Giant, the Bachelor and Three Graces, and the Faithful Couple. Such checklist tourism may be natural, given the immensity of the trees and people's need to render them comprehensible. Mithun's intervention seeks to at least furnish awareness of context. "It's about the entirety of the experience, the ecosystem as a whole rather than all of the individuals that comprise it," says Susan Olmsted, ASLA, who was the integrative design lead for architecture and landscape architecture on the project. (Olmsted is now at Perkins+Will.) "How can you understand how tall a giant sequoia is? How wide it is? How can you see these massive creatures in their entirety? It's about trying to create some space and scale so those parameters could be understood."

The plaza slopes down gently and funnels into a low boardwalk, which crosses a stream the project daylighted and restored. Suddenly the walkway's meanders become perfectly straight, tracking for nearly 200 feet right alongside the perfectly straight trunk of the Fallen Monarch. This tree has lain on its side for perhaps three centuries. In the wildness of the woods, there is a stunning

ACCESS ISSUES TO MARIPOSA ANALYSIS



1. **WAWONA LOT**
   - Fills to capacity
   - No information available about Mariposa Grove Road closures
   - Long shuttle waits
2. **INEFFICIENT AND TIME-CONSUMING VEHICLE CIRCULATION WHEN MARIPOSA GROVE ROAD CLOSES**
3. **SOUTH ENTRANCE**
   - Vehicle congestion
   - Circulation challenges
   - Parking fills to capacity
   - Long shuttle waits
4. **MARIPOSA GROVE ROAD**
   - Closed when parking lot full
5. **TIGHT CURVE CONSTRAINT FOR 45-FOOT TOUR BUSES**
6. **MARIPOSA GROVE PARKING LOT**
   - Fills to capacity
   - Visitor experience degraded by engine noise and exhaust
   - Parking congestion
7. **REQUIRED SERVICE ACCESS TO WAWONA POINT**

formality to this ensemble, like a ceremonial avenue. As you proceed, the tree slowly broadens beside you in diameter to 24 feet, ending with explosive glory in the even wider tangled nimbus of its upturned roots.

People get off the shuttle in big groups but then disperse with their own companions, at different speeds, in various directions; the flow is constant but doesn't jam up. The grove is more "like a wilderness experience now, quiet, you hear birds," Runge says; aside from the hybrid shuttles, only vehicles with disability placards come this far, and the former road through the upper grove to Wawona Point, pavement removed, is now a walking trail. Mithun's intervention has rationalized and calmed the logistics of a visit, added accessible trails, and provided formerly missing services. It has repaired the natural hydrology. Distance, perspective—the grove as a whole—are conveyed now, by the opening of long views, establishment

MITHUN

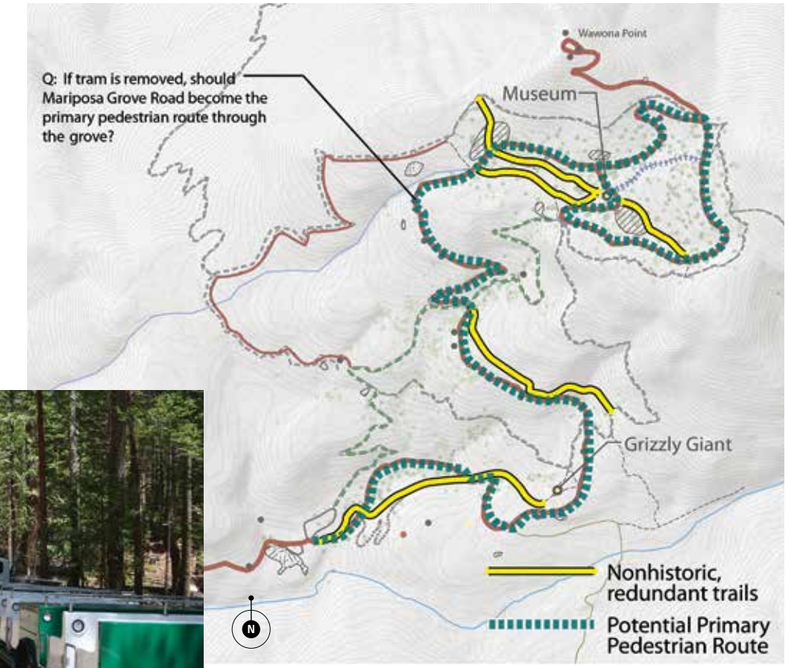
MITHUN, TOP RIGHT; JOSH HELLING, BOTTOM

TRAIL REALIGNMENT ANALYSIS

BELOW
Before, the arrival experience at the lower grove was debased by parking, trams, fuel tanks, and generators.

RIGHT
A pivotal decision was to eliminate trams and turn the paved road through the two groves into a walking path.

OPPOSITE
Access was inadequate and chaotic under the former scheme.



of strategic lookouts, even installation of "leaning benches" whose backs are canted low so you can gaze up into the canopy without hurting your neck. Individual sequoias still impress with their lofty height and elephantine girth, their room-sized hollows, their great age. Okay, they can enchant, too, with those storybook names. But the focus on individual trees has been loosened, the perception of interconnectedness enhanced. Yet here is the paradox of forest versus tree: It is intimacy with the Fallen Monarch, this single, vulnerable, powerful, dead specimen—controlled, from behind a railing, a dozen feet away, no touching—that begins to render the enormity of giant sequoias intelligible.

This evocation of feeling was undergirded by hard science. "One of the things I loved about working on this project was that we had so much great data," Olmsted says. It came from the park service's "subject matter experts in wildlife, fire management, hydrology, you name it in terms of natural science. I had stacks of files." ("Every single sapling and mature tree, *everything* had been inventoried," Runge says. "I don't know if we'll ever get to that level again on a project.") "Our job as designers was to look at what are the associations, how do you overlay these different subjects, and understand what it means for design," Olmsted continues, but "I would struggle to identify a single physical gesture that pulled it all together, with the exception of saying it really is the giant sequoia ecosystem."

Beatty says that compared to other stands of the species, Mariposa Grove is relatively healthy. Fire reduces competition with other species for water and nutrients, and makes space for giant sequoia

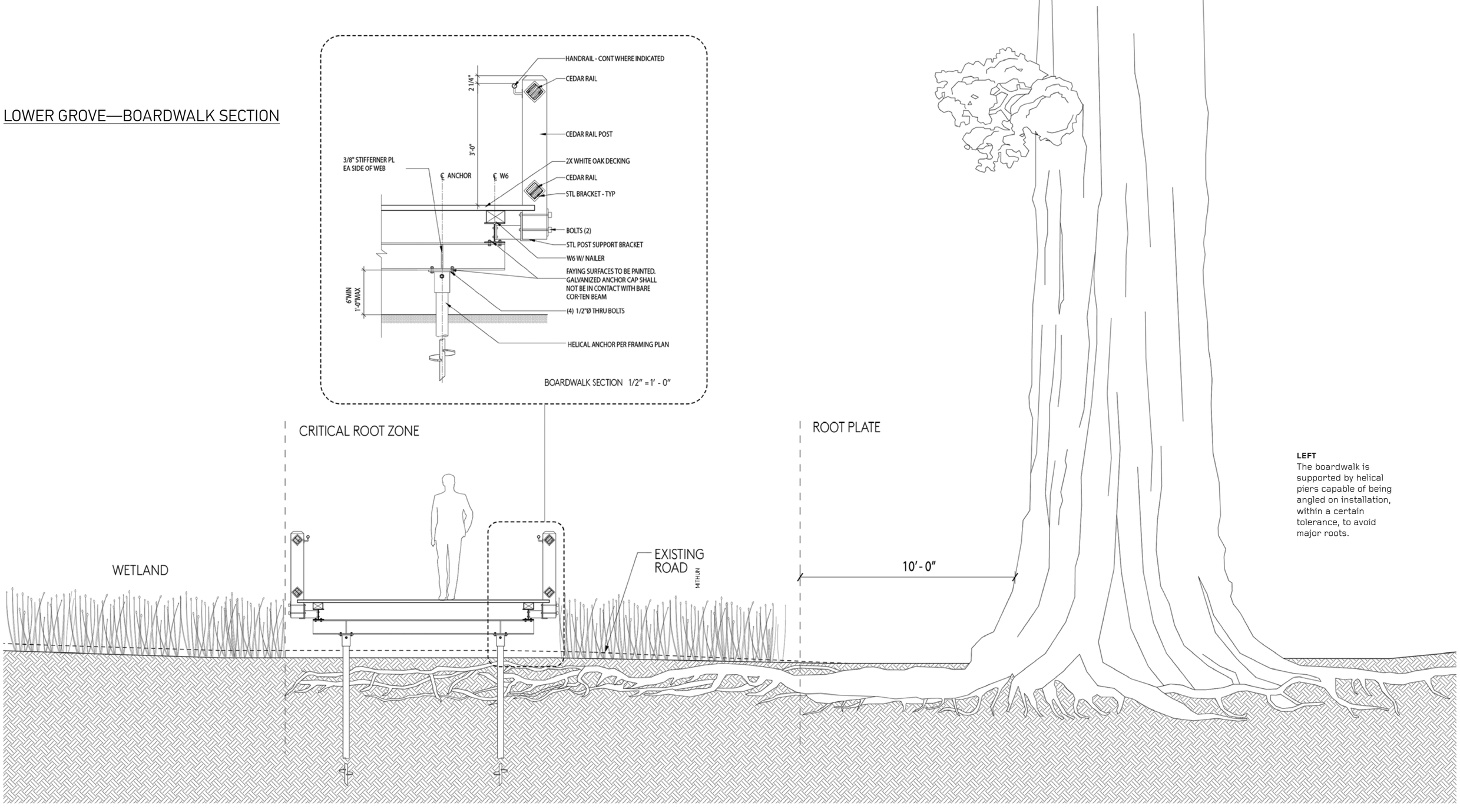
JIM SUGSNON

LEFT
Boardwalks and trails now make an intimate experience of the lower grove available to all visitors.

seedlings. Because of misguided fire suppression, "There was a gap of about a hundred years [at Mariposa Grove] where we weren't getting reproduction." Before then, "it could have been from Native American practices, and lightning strikes for sure; there would have been a fire in the grove every 10 or 12 years." After the need for fire was understood, a prescribed fire program was initiated in 1970.

There are about 70 groves of giant sequoias on the western flank of California's Sierra Nevada. They grow only in a band between 5,000 and 7,000 feet in elevation, which is the rain–snow transition zone. Emily Burns, the director of science at the Save the Redwoods League, calls these locations the best possible places for these giant trees to survive. "Water stays in meadows and wetlands in and adjacent to these groves; they tend to be really wet pockets. The question is how much change can they tolerate?" she says. Some kinds of habitats can be expected to migrate with climate change. A fast-reproducing mangrove forest on the Florida coast could shift inland along with rising seas, taking associated flora and fauna along. But giant sequoias exist on a different time scale. Besides, Beatty points out, "We're seeing that other species are moving up, to get away from heat

LOWER GROVE—BOARDWALK SECTION

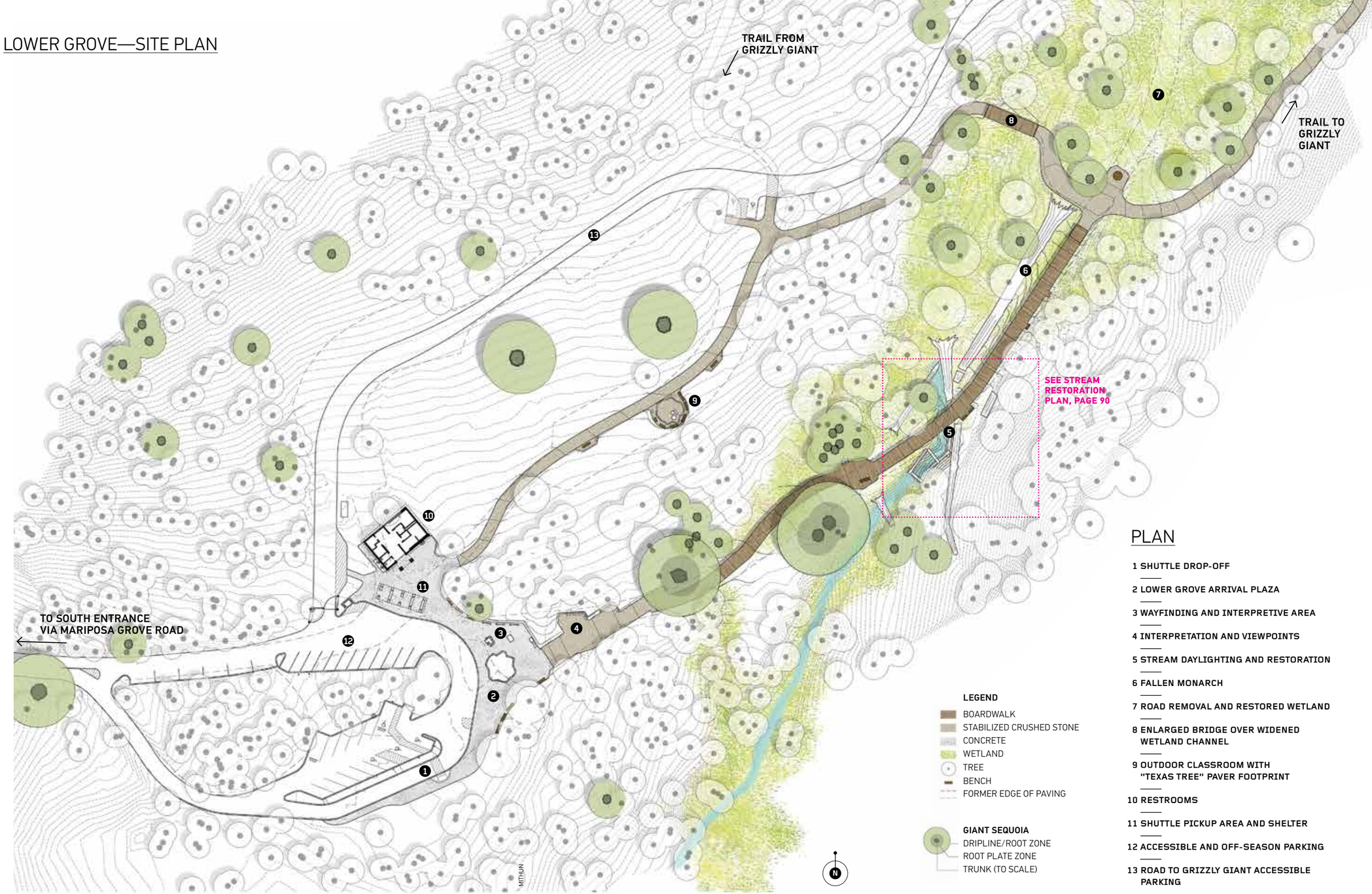


LEFT
The boardwalk is supported by helical piers capable of being angled on installation, within a certain tolerance, to avoid major roots.

or get closer to the snow line. But in the Mariposa Grove there's no more uphill right in the vicinity for them to move to."

Burns says, "We're getting more summer rain, which could help the giant sequoias in the short term, but it also could melt the snowpack earlier," reducing available water later in the season. Where some groves are, fire suppression remains the practice. "When we do have drought years, the concern is around increasing fire and time since last burning. Beetles and drought mortality in other conifer species are reducing competition, as neighbors die within these groves. But when these forests do inevitably burn, you have the risk of large giant sequoias actually dying just because the fire is so much stronger if there hasn't been proactive mechanical thinning or prescribed fires to lower the fuel load." For faster-growing species, human-assisted habitat migration might be practical, and there are researchers collecting giant sequoia seeds "to preserve for planting in other locations," Beatty says, though "it goes against the grain of what I was brought up to do, so maybe that's for new generations to struggle with."

LOWER GROVE—SITE PLAN



PLAN

1 SHUTTLE DROP-OFF

2 LOWER GROVE ARRIVAL PLAZA

3 WAYFINDING AND INTERPRETIVE AREA

4 INTERPRETATION AND VIEWPOINTS

5 STREAM DAYLIGHTING AND RESTORATION

6 FALLEN MONARCH

7 ROAD REMOVAL AND RESTORED WETLAND

8 ENLARGED BRIDGE OVER WIDENED WETLAND CHANNEL

9 OUTDOOR CLASSROOM WITH "TEXAS TREE" PAVER FOOTPRINT

10 RESTROOMS

11 SHUTTLE PICKUP AREA AND SHELTER

12 ACCESSIBLE AND OFF-SEASON PARKING

13 ROAD TO GRIZZLY GIANT ACCESSIBLE PARKING

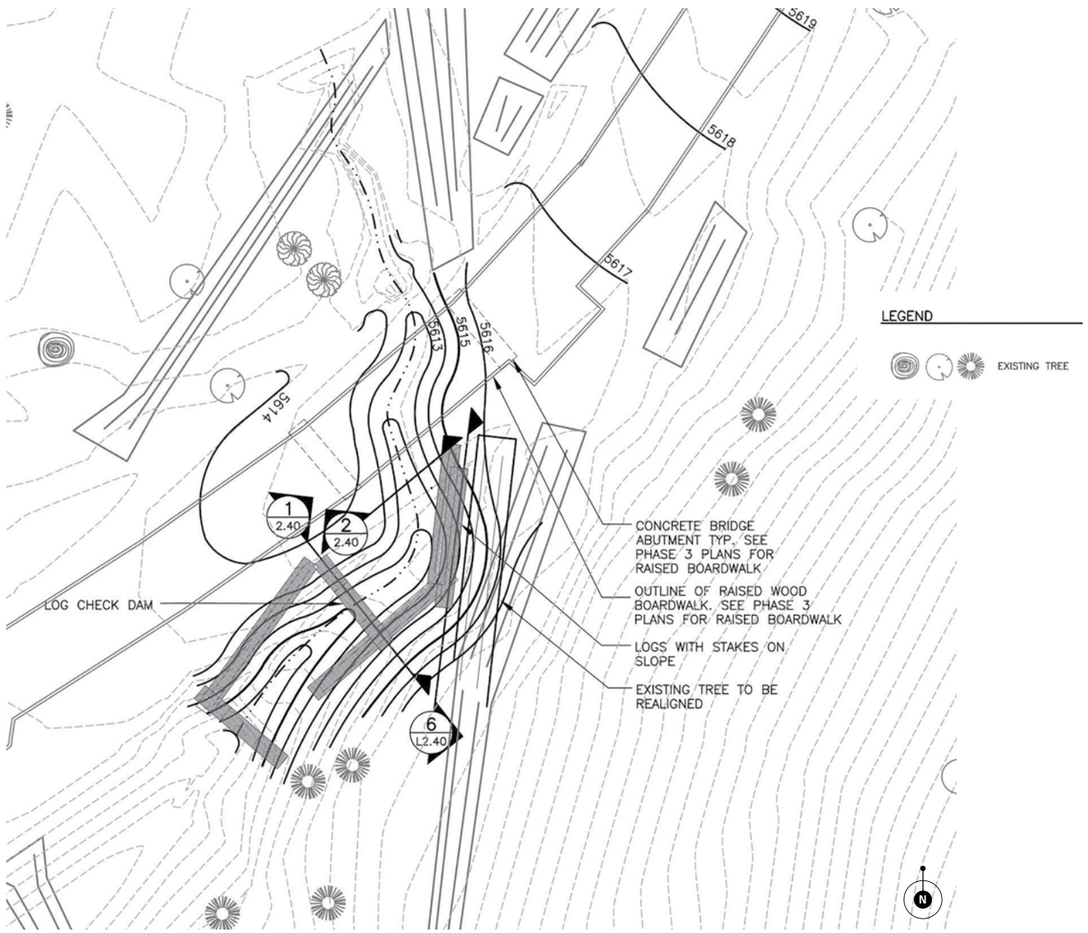
CHRISTIAN HUNOLD, ASLA

FROM ROAD TO WETLAND
The area just north of the Fallen Monarch was once a paved road and has been restored to a wetland that was planted one year before opening to allow for it to grow in.

"FINGERS OF WETLAND STREAMS WERE BEING INTERRUPTED BY CULVERTS THAT WERE BLOCKED."

—CHRISTIAN RUNGE, ASLA, MITHUN

LOWER GROVE—STREAM RESTORATION PLAN

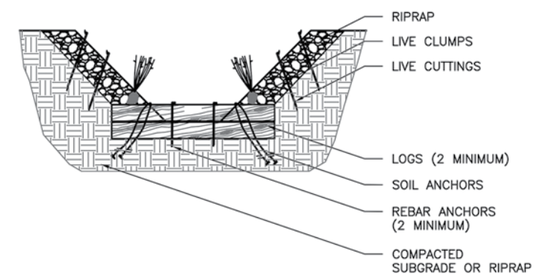


MITHUN

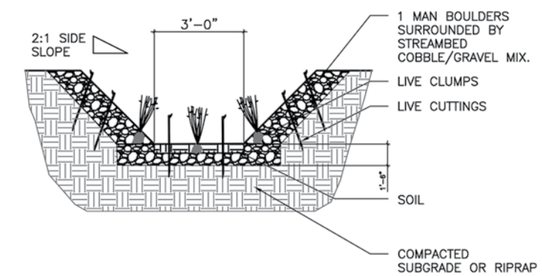
LOWER GROVE—STREAM RESTORATION DETAILS

MITHUN

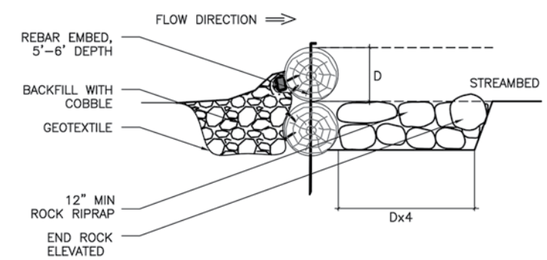
LOG CHECK DAM SECTION



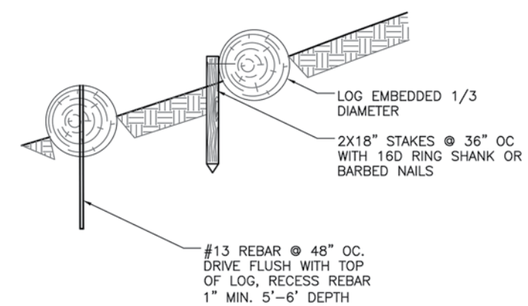
STREAMBED SECTION



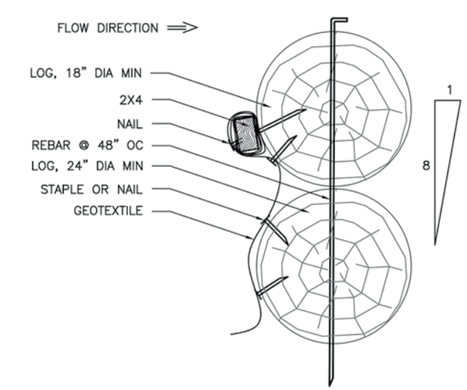
LOG CHECK DAM



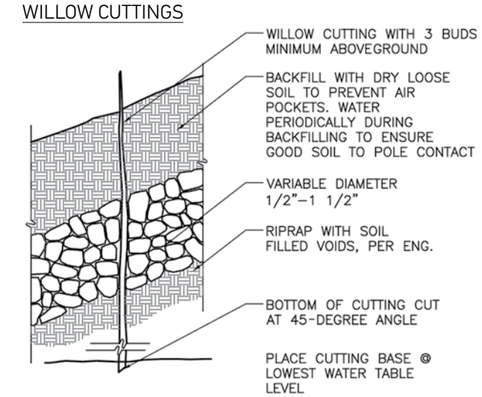
LOGS WITH STAKES ON SLOPES



LOG CHECK DAM (DETAIL)



WILLOW CUTTINGS



SOUTH ENTRANCE—LOADING AREA AND INTERPRETIVE AREA

RIGHT
At the main arrival area, parking, plaza facilities, and shuttle loading are separated onto terraces to minimize their impact.

OPPOSITE BOTTOM
The lower grove arrival plaza narrows gently and asymmetrically, funneling visitors toward the boardwalk.

MITHUN; TOP, CHRISTIAN RUNGE, ASLA; BOTTOM AND OPPOSITE

Burns is a guarded optimist. "These trees have lived for millennia rooted in the same place, as climate has already changed dramatically," she says. "The parks, the public land managers, and groups like us that are using science are going to come up with ways to reduce stress on these trees. And the Mariposa Grove project is an excellent example of that, of how we can, by removing or changing infrastructure, help them have more access to water."

"There were high stakes for the success of the project," Olmsted says, "because people cared. Mariposa Grove is where the preservation movement began. It's one of the most influential, important, and treasured landscapes in the entire world, and the world's attention is on this place."

JONATHAN LERNER IS FINISHING A NOVEL, *LILY NARCISSUS*.

Project Credits

DESIGN TEAM LANDSCAPE ARCHITECTURE, ARCHITECTURE, AND PLANNING MITHUN, SEATTLE. **CIVIL ENGINEERING** DAVID EVANS AND ASSOCIATES, DENVER; SHERWOOD DESIGN ENGINEERS, SAN FRANCISCO. **TRANSPORTATION** NELSON NYGAARD, SAN FRANCISCO; IBI GROUP, DENVER. **STRUCTURAL ENGINEERING** KPFF, SEATTLE. **MECHANICAL, ELECTRICAL, PLUMBING** WSP GROUP, SEATTLE. **EXHIBIT PLANNING** EDX, SEATTLE. **EXHIBIT DESIGN** LESLIE STONE ASSOCIATES, SAUSALITO, CALIFORNIA. **GIANT SEQUOIA EXPERT** ROBERT YORK, UNIVERSITY OF CALIFORNIA, BERKELEY, BLODGETT FOREST RESEARCH STATION, GEORGETOWN, CALIFORNIA. **ACCESSIBILITY CONSULTANT** STUDIO PACIFICA, SEATTLE. **GEOTECHNICAL** SHANNON & WILSON, DENVER. **IRRIGATION** WILLIAM BROWN LANDSCAPE ARCHITECTS, BOTHELL, WASHINGTON. **COST ESTIMATION** R. BORINSTEIN COMPANY, SAN ANSELMO, CALIFORNIA. **CONSTRUCTION, SEQUOIA GROVES** YOSEMITE NATIONAL PARK TRAILS AND CONSTRUCTION CREW, EL PORTAL, CALIFORNIA. **GENERAL CONTRACTOR, BUILDINGS** TREELINE CONSTRUCTION, NAPA, CALIFORNIA. **ROAD DEMO AND CIVIL CONSTRUCTION** MARTIN BROTHERS CONSTRUCTION, SACRAMENTO, CALIFORNIA.
NATIONAL PARK SERVICE PROJECT MANAGER KIMBALL KOCH, MIDPINES, CALIFORNIA. **LEAD RESTORATION ECOLOGIST** SUE BEATTY, EL PORTAL, CALIFORNIA.

CHRISTIAN RUNGE, ASLA

FALLEN MONARCH
Single, vulnerable, powerful, and dead, the tree renders the scale of giant sequoias intelligible.