

A Greening on the Sundown Coast

by Wesley Marx

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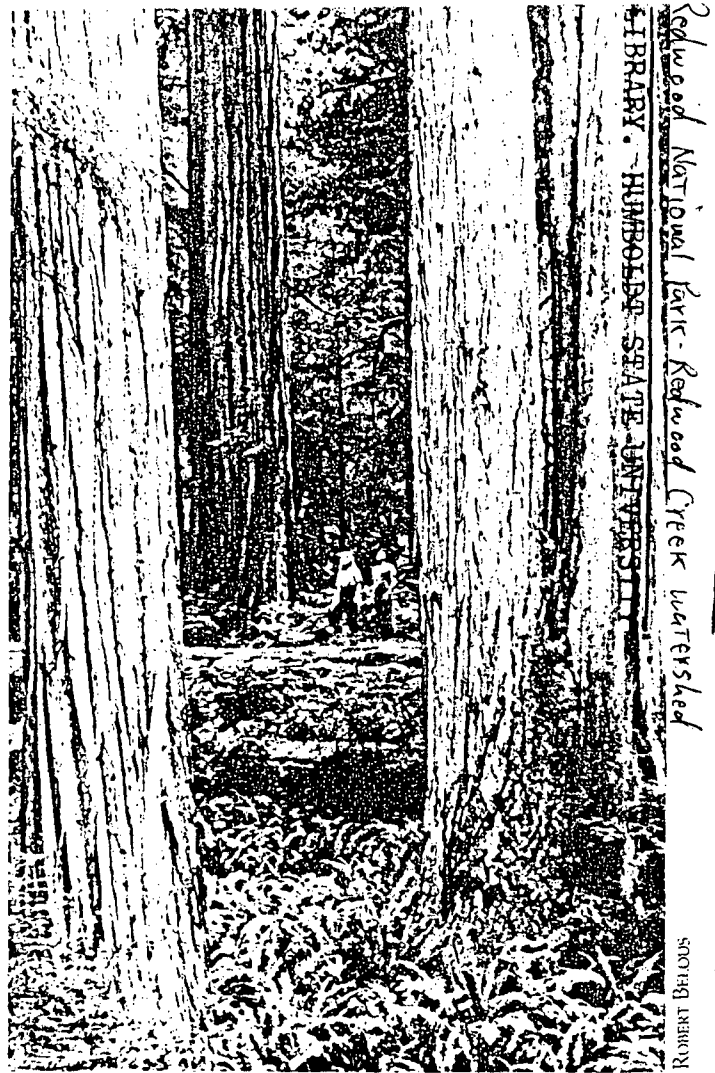
In 1978, the logged hillsides upstream from the world's tallest trees were hard to envision as National Park land. They looked more like ground zero for a Hollywood nuclear epic. Landslides had thundered down, ripping up shrubs that had sprouted after ancient trees had been hauled to sawmills. Gullies caused by roads carried tons of sediment, and Redwood Creek, where king salmon once ran thick enough for farmers to pitchfork, was choked with mud. Yet that year Congress added over 36,000 acres of this collapsing coastal watershed to 58,000-acre Redwood National Park in Humboldt and Del Norte counties.

It was a belated move to protect the world famous Tall Trees Grove, which includes a 600-year-old giant that rises to 367 feet and would shade out a 30-story skyscraper and a football field. A decade earlier, when the park was created, "we tried to warn Congress that to protect the trees you needed to protect the surrounding watershed," recalls Lucille Vinyard of Trinidad, who has worked with the Sierra Club and other groups for the park. The boundaries drawn, however, reflected a political compromise between the lumber industry, conserva-

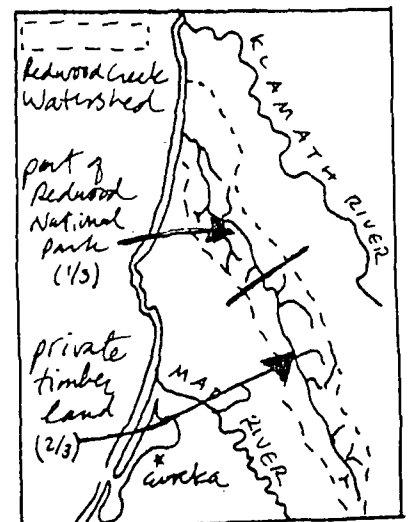
tionists, and budget-conscious federal officials. Only after the slopes had been logged, and the ancient redwoods were in imminent danger from landslides and flooding, was more of the watershed acquired for protection. Congress then gave the National Park Service the environmental equivalent of "Mission: Impossible"—reclaim this devastated land before it destroys the Tall Trees Grove.

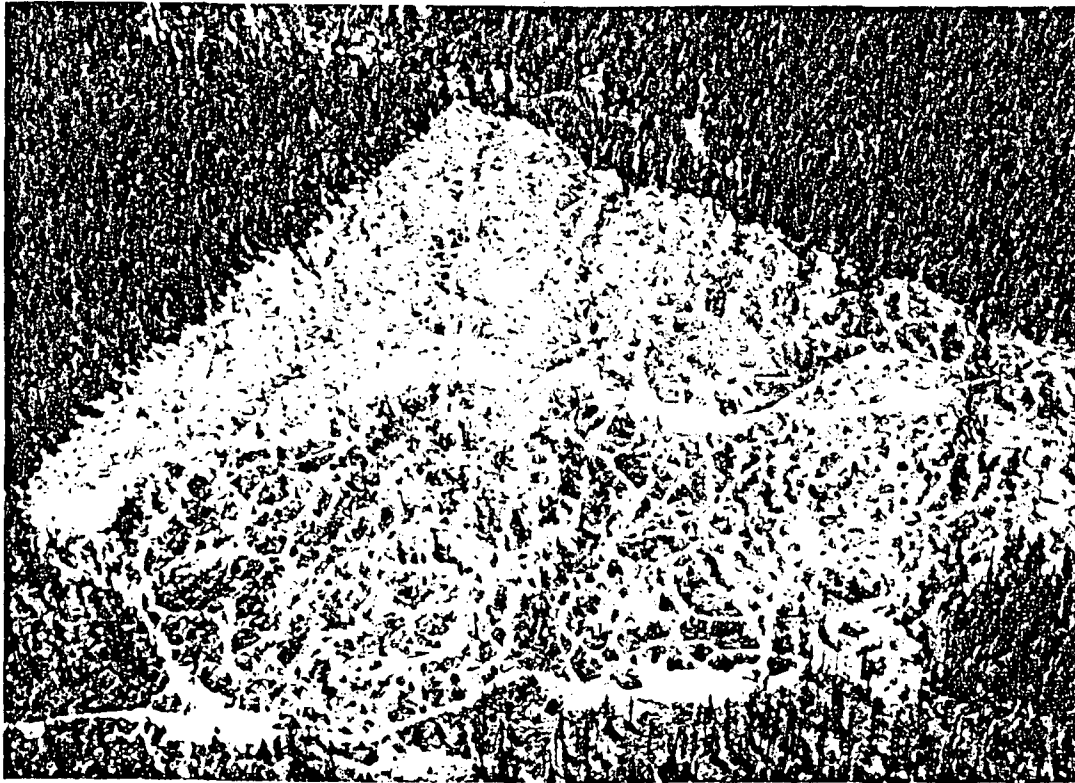
The Redwood Creek watershed is modest in size but dramatic in character. The creek is only 55 miles long from its headwaters to the Pacific Ocean, but it drains about 280 square miles of land. Some steep slopes rise as high as 5,000 feet. Some 74 tributary streams tumble down, and in big rainfall years the mild-looking stream turns into a raging torrent.

To many people it was obvious that timber cuts on such a steep watershed would accelerate runoff and erosion. In 1955 and 1964, the Bull Creek portion of Humboldt Redwoods State Park suffered severe damage from timber-induced silt loads and flood debris. As Susan Schrepfer noted in *The Fight to Save the Redwoods: A*



ROBERT BELOUS





Erosion from logged hillsides threatened to undermine the Tall Trees Grove in Redwood Creek Basin. This 240-acre logged area was part of the 48,000 acres added to the park in the 1978 expansion. Of this acreage, over 75 percent had been logged as clear-cuts at some time, and the rest of the acreage was purchased by the park, tree by tree. The narrow white lines are tractor skid trails used to drag logs off the hill. The wider lines are roads for logging trucks.

History of Environmental Reform, 1917-1978 (University of Wisconsin Press, 1983), "The acquisition of the flats at the base of the privately owned watershed invited disaster."

The timber industry, however, was adamant. It was prepared to forsake control of the Tall Trees Grove, which is on the alluvial flats of a horseshoe bend, but not of the surrounding watershed. With heavy machinery, the steep hillsides could be made to yield their stands of redwood and fir. The state of California, with Ronald Reagan as governor, assured that the mechanized harvests would be carefully regulated, so that the industry would be a good neighbor. President Lyndon Johnson signed a bill creating a park that included the Tall Trees Grove but excluded most of the basin. Later, one isolated redwood grove would be named after Lady Bird Johnson.

During the next decade, families that staked their yearly vacation on a glimpse of the Tall Trees had to run a gauntlet of logging trucks and stump-filled hillsides to get to them. One park overview was named Devastation Point. Going into the redwoods was like going to Disneyland and getting the Texas chain saw massacre instead. Meanwhile, timber harvesting

practices in the watershed—some no longer allowed—un-leashed slides and mud flows that intruded into the park. Slugs of silt raised the level of the creek bed five feet.

The elevated creek bed posed a three-fold threat to the Tall Trees Grove, as explained to me by park geologist Mary Ann Madej. Rising groundwater could drown the shallow root system of the redwoods. Bank erosion by the rising creek waters could topple the trees. "Some redwoods up creek of the grove have already been lost because of such erosion," notes Madej. Eventually, flood overflows could deposit damaging sediment in the

grove itself. "We knew these cutover acres would have to be restored if the park was to have a decent future," says Vinyard.

In 1978, Congress and President Carter agreed, thanks in part to prodding by Rep. Phillip Burton of San Francisco, by adding 48,000 acres in the watershed, over 36,000 of which had been clear-cut, to the park and appropriating \$33 million for reclamation. The upper two-thirds of Redwood Creek basin remained in the control of the timber industry, however. California, then under Gov. Jerry Brown, assured that the timber industry's hillside act would be cleaned up and that National Park officials could review timber harvest plans and inspect harvest sites in the upper basin. It appeared that the redwoods had been saved. . . again.

Mission: Impossible

The scope of the reclamation project before the Park Service was immense. Nothing like it had ever been tried in an area with such unstable geology. The rugged watershed is the crunched up product of two major tectonic plates—the North American Plate and the Pacific Plate—colliding head-on. Redwood Creek winds along the trace of a fault. The park's first

plan of attack was a labor-intensive replanting program. A team of geologists, botanists, and rangers began to hike up the slippery slopes. "At first, a lot of time and labor was expended to replant barren slopes," explains park geologist Dave Steensen. Bundles of willow twigs, called willow wattles, were buried on the bare slopes in hopes they would sprout and green up the hills. But this European technique proved time-consuming and not very effective on the drier slopes. Moreover, winter rains could quickly wash away these good intentions and carve out deeper gullies.

"We began to realize that old logging roads, not the cutover land per se, were major culprits of erosion," says Steensen. Roads dammed or diverted hillside streams, forcing winter flows onto the barren, slide-prone slopes, and creating highly erodible gullies.

The restoration team then shifted to a new tactic. It would stabilize or "put to bed" 300 miles of haul roads and 3,000 miles of tractor trails. At the same time, it would also excavate and restore the original stream beds.

The new plan required heavier tools. "We couldn't do this with just hands and shovels," Steensen explains. The Park hired some of the huge crawler tractors and hydraulic excavators, which were being used to build more logging roads in the upper basin, to put old roads in the park to bed and restore stream beds.

Once a roadbed was "outsloped"—recontoured into the hillside—the plan called for its replanting with grass or trees to resist erosion. However, the restoration team noticed that this might be unnecessary, that it might even be counterproductive: Bald spots along the retired roadbed were being quickly colonized by coyote bush, salal, Douglas fir, redwood, and other members of the surviving forest community. This same community can reseed the barren slopes once the runaway stream flows are returned to their jilted beds. Plant grass and you would only slow the process of natural reseeding, the restorers concluded. Instead, they decided to lay down straw mulch, up to 5,000 pounds per acre, to protect the seedbed from sheet and rill erosion. They also planted thousands of trees.

By 1983, such treatment forestalled erosion of some 6.6 million cubic feet of sediment—enough to fill up a 150-mile-long parade of dump trucks, according to park ranger Robert Belous. Today, about half the old road system has been put to bed and the greening continues. Even from infamous Devastation Point the view is green, ranging from the light bright green of new growth to the darker shades of taller, old and advanced growth, which can reseed the abused lands. Visitors now can believe they are in a National Park and not in a war zone.

A Hopeful Beginning

On a recent winter day, Steensen and fellow geologist Darci Short took me to K and K Road, which once was a virtual industrial freeway that opened the ancient forest to harvest. Foot by foot, mile by mile, this roadbed is being rolled up like a carpet, leaving a trail of decaying straw and thrusting green shoots. As the road goes, so goes easy access, whether for loggers, park car caravans, or firefighting units. This is a second-chance forest that is being put on its own again, free to confront lightning fires, slides, and droughts on its own evolutionary terms. When I return, it will be on foot.

As we walked along a creek bed shaded by alders, we could see that another major resource was getting a new lease on life: Remnant runs of salmon and steelhead might soon be reclaiming ancestral spawning grounds. Silt flows within park boundaries have receded, and the waters of Redwood Creek are beginning to clear.

Other reclamation opportunities are being pursued. In summer 1989, Short supervised the removal of an old dam on Lost Man Creek, so salmon can regain more upstream spawning habitat.

Historically, the juvenile salmon have drifted downstream into Redwood Creek estuary where they could feed and gain strength before leaving for the rich pastures of the Pacific Ocean. In the 1960s, flood control dikes were installed, cutting off flows to an arm of the estuary, South Slough, once used by salmon. Ergo, another restoration opportunity. In 1988, "we installed a gated culvert in the dike to restore the flows," says park hydrologist

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Recontouring a road to recover topsoil and natural hillslope drainage pattern. In foreground, Redwood National Park geologist Louise Johnson with supervisory geologist Terry Spreiter.

At right: Heavy equipment removes soil from a stream valley that had been buried during road construction before the land was made part of the park. In the foreground, Redwood National Park geologist Louise Johnson.



Randy Klein. The flow levels can be controlled to prevent flooding of pasture next to the slough. Today, with South Slough in circulation again, some 117,000 salmon a year that spend summer in the estuary have a much better chance of survival.

Another important aspect of the restoration effort is the battle against invasive weeds that crowd out natives and can harm animals. Botanist Mary Hektner's arsenal in this battle include a flame thrower and a small, gold-colored beetle. "The flame thrower destroys alien weeds that choke off native wildflowers," she says. "The beetle chews up a toxic weed, the tansy ragwort, which can cause liver disease in grazing animals." Neither weapon may suffice, however, for one of California's most invasive aliens: pampas grass. "It is tenacious. We may have to use herbicides," says Hektner.

Like other aspects of restoration, bringing back native plants requires persistence. Some vanquished weeds could return by hitchhiking on straw used to mulch the recovering roadbeds and slopes. "We screen sources of straw to reduce this problem," says Hektner. "With local sources we could wind up with the tansy ragwort again."

Management by Fire

While the Park Service hopes to restore the watershed ecology so it can care

for itself, in at least one instance active management appears to be required.

The name of the ridgeline road that overlooks the recovery process—Bald Hills—does not refer to clear-cuts, but to a series of prairies and oak woodlands that crown the upper slopes. Here one can straddle two climate zones, the fog-wreathed zone at lower elevations that provides the fossil redwoods with their last moist holdout on the planet, and the sun-splashed, blue sky zone of grasslands and spring wildflowers rippled by sea breezes. The sunny scene is, in part, a cultural artifact.

"The Native Americans, by periodic burnings, created and maintained these prairies as foraging grounds for deer and elk," says Hektner. "Later, ranchers raised prize-winning sheep here." Without being put to the occasional torch, these prairies could be overtaken and shaded out by the uphill advance of Douglas firs, depriving today's deer and elk herds of food. The Park Service has decided that in this case it would intervene in natural processes and mimic the prescribed burnings practiced by Native Americans.

Lessons in Restoration

Today, the park recovery process attracts national and even global interest. Forestry experts from China, Norway, and Ecuador visit to observe the mechanical

excavators, the golden beetle, and the human healers at work. Closer to home, the return of green slopes and clear water has helped to encourage community-based efforts to restore the Eel, the Mattole, the Noyo, and other battered watersheds along the northern California coast.

Before the advent of industrial logging, the coastal watersheds of Northern California supported more than a half million spawning salmon, according to the California Sea Grant program. Since then, salmon runs have declined by as much as 80 percent, according to the California Advisory Committee on Salmon and Steelhead Trout, a state legislative advisory body. "Hatcheries have never been able to offset the loss of habitat," notes committee consultant William Kier. That is one reason why California, once salmon-rich, must import wild salmon from Alaska and Canada, fish-ranch salmon from Norway and Chile, and smoked salmon from Scotland. Legislators, including Sen. Barry Keene, Assemblyman Dan Hauser, and Rep. Douglas Bosco, have been lobbying for permanent funding sources that would help more coastal watersheds to regain their natural salmon heritage.

In this year's June election, voters approved Prop. 117, the Wildlife Protection Initiative, which will provide \$30 million a year to improve and restore wildlife habitat, including salmon and trout watersheds. This investment could pay some handsome dividends. The state Salmon Advisory Committee estimates that a doubling of the current salmon and steelhead stocks could generate 8,000 new jobs and add \$150 million a year to business revenues.

Geologic Frankensteins

Besides demonstrating the potential for reclamation, the lessons being learned at Redwood Creek could prevent other watersheds from turning into geologic Frankensteins. "More careful siting and maintenance of hillside logging roads could avert future mud slides and more lost salmon runs," says park geologist Danny Hagans. If California required timber companies to keep road culverts open permanently—instead of just a few years—the risk of stream diversions would

diminish. If dips were required at stream crossings, streams would continue to flow in their natural channels when culvert systems fail or become plugged. If careful geological investigations were routinely conducted before timber harvest plans were approved, unstable hillsides could be better identified, where the risks of slides and massive silt loads might outweigh short-term benefits of logging. Based on their extensive investigations, park geologists have been urging the California Department of Forestry and the State Water Resources Control Board to adopt such policies.

Logging Upstream

And with good reason. The upper Redwood Creek basin, which lies outside park boundaries, is currently being logged. "If road building is not carefully controlled, this area could become a loaded gun pointed at the park," says Hagans. In a rerun of the frenetic 1970s, the gains in controlling erosion within the park could be offset by activities upstream. Given the federal deficit, it is unlikely that Congress will step in again to buy up another cutover segment of the basin and undertake another round of reclamation.

What about those state assurances that the Park Service could review upper basin harvest plans? "Beginning in early 1983, a change in administrative procedures implemented by the California Department of Forestry (CDF) effectively precluded National Park Service participation in the field review of timber harvesting and road construction plans on lands upstream of the Park Protection Zone but within the Redwood Creek Watershed," reads the Park Service's 1988 Tenth Annual Report on the status of Redwood National Park. According to this report, the state Department of Forestry only allows park participation if the timber company consents. "With rare exception, landowners regularly and routinely refuse access to park professionals for either

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After stream channels had been excavated, straw was spread on the slopes to protect them from the impact of rain and provide a bed for natural seeding from surrounding trees.



Top: After two winters of natural alder recovery. Regrowth by alders depends on the conditions of the slope. Dry southern slopes, unstable road fill and rocked logging roads cannot be expected to regrow quickly. After about 30 years, the alders will give way to conifers. Bottom: Newly completed stream excavation.

pre- or post-harvest inspections," reads the report. In other words, the park professionals get to inspect the harsh consequences of harvesting—more sediment loads entering the park—and little else.

As the Redwood Park experience indicates, our emerging ability to restore coastal watersheds and wetlands can still remain hostage to careless development practices. A group of north coast environmental organizations has placed on the November ballot an initiative called Forests Forever. This initiative (Proposition 130), if passed by state voters, would require the state to tighten up its timber regulations, including restoration of logging roads and protection of watercourses. The timber industry has countered with another initiative (Proposition 138), which it calls "Global Warming" and the Planning and Conservation League derides as "Big Stump."

Across the continent, in Florida, another National Park is being threatened by careless watershed practices. Sugar

cane growers dump dirty, nutrient-rich irrigation runoff into the fabled "river of grass" that sustains Everglades National Park. The nutrients trigger a major botanical revolution as native sawgrass is being crowded out by dense stands of cattails. Wading bird populations have dropped by 80 percent. For decades, the Park Service and environmental groups have urged the state to require sugarcane growers to clean up their dirty discharges. Finally, they have a critical ally. The U.S. Department of Justice has filed a landmark suit, which if upheld in court, would require Florida to protect the Everglades from such upstream mischief. This is one lawsuit that besieged park managers will follow with great interest. □

Wesley Marx is author of The Frail Ocean; The Oceans: Our Last Resource; and the introduction to Pacific Coast: A Rugged Harmony.