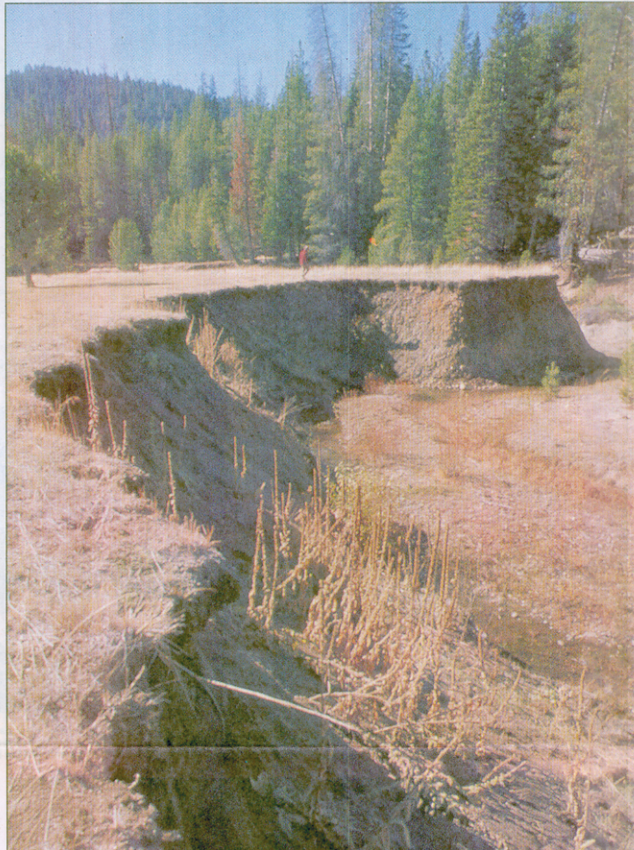


MAJESTY AND TRAGEDY  
**THE SIERRA IN PERIL**

Autumn colors transform Peppermint Creek in the Sequoia National Forest, left, into a forested quilt of gold, yellow and amber. In stark contrast, years of overgrazing have turned once-sparkling Lone Rock Creek in Plumas County, below, into a soil-choked gully.



# SOIL

## Erosion washes away precious watersheds

Fourth of five parts

By Tom Knudson  
Bea Sierra Bureau  
© 1991 The Sacramento Bee

**T**AYLORSVILLE, Plumas Co. — All weekend long, the phone at Mike Kossow's home would not stop ringing.

"People were real concerned," said Kossow, a hydrologic technician with the Plumas National Forest. "They had never seen anything like it. Indian Creek was just solid mud."

On Monday, Kossow hopped in a plane to investigate, following a winding trail of muddy water high into the mountains.

Thirty miles upstream, along a ridge where Indian Creek is born, he found a disaster — a moonscape of eroded land and denuded forest that looked more like the highlands of Ethiopia than the Sierra Nevada.

The disaster, however, was not a random act of nature, though nature did play a role. Nor was the work of a careless mixer or rancher. The seeds of this calamity were sown by the U.S. Forest Service.

It began with a timber sale, one designed to help the agency control its archenemy: fire.

The idea was simple: Prune the forest, starve a fire. But this job along Last Chance Creek, a tributary of Indian Creek, was more than weekend shrub trimming. Entire sections of forest were leveled, leaving the land barren and vulnerable.

Then, on the evening of July 18, 1990, disaster struck: Lightning flickered along the ridge, wind moaned through the hills and the sky let loose with 5 inches of driving rain.

A quarter-million tons of soil crumbled like sugar off the steep slopes. Gullies filled with mud. Roads washed out. Culverts ran wild. And the champagne water of Indian Creek turned to sloppy brown gruel.

Today, the region suffers.

"Of enduring concern is the severity of soil loss (and) the initiation of dense gully networks," Ken Cawley, a zone hydrologist for the Plumas National Forest, said in an internal report obtained by the Bee through the U.S. Freedom of Information Act.

"Further accelerated erosion can be expected in the future. Changes for seedling survival have been adversely affected on several hundred acres."

The incident, while dramatic, is not unusual. Along the back roads of the Sierra Nevada is a battered and bleeding land, places where trees, grass and other vegetation have been peeled away and soil is washing into mountain streams at staggering rates.

The problem draws little attention, though, partly because gullies and unlike spotted owls are not very glamorous.

But damage to soil and streams is perhaps the most serious and overlooked problem in the Sierra Nevada, one that threatens the essence of the range and the lifeblood of California: mountain watersheds.

The magic begins every spring with a familiar sound — the tap-tap of water dripping from the snowy eaves of the Sierra. The drops turn to trickles, the trickles turn to torrents and the Sierra thunders with the sound of rushing water.

But not just any water — cold, clear mountain water, electric an empire. Six of every 10 gallons of water used in California — the most populous, prosperous state in America — come tumbling from the Sierra.

Today, this mountain spigot is under siege. From Kernville to Quincy, logging, road building, mining, grazing and forest fires are gouging, burning and ripping up the epidermis of the mountains, the spongelike outer layer of soil, trees and vegetative cover crucial to water quality and quantity.



Minerals from the Pioneer Pit mine are leached into the water flowing into Slate Creek in Sierra County.

Consider:

- In the Plumas National Forest, 30 percent of the water is so fouled by erosion that it no longer meets state water quality objectives, Forest Service documents show. In some areas, erosion is so severe that bedrock is beginning to show.
- Pacific Gas and Electric Co.'s Rock Creek Reservoir — downstream from the Plumas National Forest — is choking with mud and debris. The reservoir, in fact, is more mud than water — over half of its capacity is consumed by mud and silt.
- Once carpets of grass and wildflowers, meadows across much of the Sierra are now partial deserts of gullies, barren, compacted ground and sagebrush, the handiwork of one of the oldest problems in the mountains — livestock grazing.

Government is doing little to make things better. The Forest Service has a tradition of putting logging and grazing ahead of watershed protection. The agency is starting to change, but slowly. Currently, about 35 percent of its budget goes to logging, while only 2 percent to 3 percent goes to soil and watershed protection.

Along Last Chance Creek, the Forest Service acknowledges the pressure to harvest timber was enormous.

"I was really leaned on to push, push, push — so we could get somebody to log it for the benefit of the local community," said Kathy Hammond, the district ranger who approved the logging operation.

"If that timber had just stood there and rotted, then we would have had to answer why our process took so long and the local sawmills and timber operators weren't able to take advantage of that local timber," said Hammond, now a public affairs officer for the Plumas National Forest.

"That's always a part of the rush, some of which I have a problem with. It's hard to feel as if you've thoroughly analyzed everything when you're under that kind of time frame."

In the mountains, the damage grows quickly. The rate of soil loss along Last Chance Creek was almost unmeasurable, more than 3,000 times above normal, according to Cawley's report.

"That's always a part of the rush, some of which I have a problem with. It's hard to feel as if you've thoroughly analyzed everything when you're under that kind of time frame."

"That's always a part of the rush, some of which I have a problem with. It's hard to feel as if you've thoroughly analyzed everything when you're under that kind of time frame."

"That's always a part of the rush, some of which I have a problem with. It's hard to feel as if you've thoroughly analyzed everything when you're under that kind of time frame."

"That's always a part of the rush, some of which I have a problem with. It's hard to feel as if you've thoroughly analyzed everything when you're under that kind of time frame."

"That's always a part of the rush, some of which I have a problem with. It's hard to feel as if you've thoroughly analyzed everything when you're under that kind of time frame."

"That's always a part of the rush, some of which I have a problem with. It's hard to feel as if you've thoroughly analyzed everything when you're under that kind of time frame."

heavily logged slopes at a rate of 318.3 tons per acre — up to 671.8 tons per acre in places.

"Here you had one storm that set Mother Nature back (tens of thousands of years)," said Lyle Steffen, a geologist with the U.S. Soil Conservation Service. "Events like that really have an impact over the long term."

"Anytime you lose over 100 tons of soil per acre, you're talking about serious, serious erosion. You're talking about the destruction of the soil for future use. I mean, it's gone."

"That land on the Plumas won't be productive for a long time. We, as citizens, won't be able to make a living off it — and certainly the Forest Service won't be able, either."

"Soil erosion is not a glamorous problem. But it is a problem — it's the kind of thing that will sneak up and get you down the road."

Open a window and look out on the late 19th century. Across the West, forests are falling and rivers are silting in. A worried Congress creates the national forest system with two things in mind: Protect forests — and water, too.

"No national forest shall be established," Congress said in the Organic Act of 1897, "except to improve and protect the forest or for the purpose of securing favorable conditions of water flows." (Italics added.)

A healthy forest, lawmakers concluded, was a river's best friend — a natural plumbing system that soaked in water like a sponge, filtered it, stored it underground and released it gradually.

And for half a century, that's how things went. Wood and water danced along in a kind of happy duet. Then, after World War II, the harmony came crashing to a close.

Around the nation, private stands of timber dwindled, wood prices soared and Congress opened the gate to logging on national forests. And streams began to suffer.

Today, they continue to suffer.

"Has anybody told you about the 'bloody eyeball' map?" asked Michael Jackson, an attorney for Friends of Plumas Wilderness, a conservation group based in Quincy. "That's sort of the local name for it. What it is is a map of the watersheds on the Plumas National Forest that are in a degraded condition."

"The map shows that every stream on the forest, with the exception of one, is degraded."

Today, the Forest Service is trying to restore the harmony of wood and water. But with a budget tied to logging, progress is slow.

"The dilemma is we have three or four timber harvest planners on each of our districts, and we're just starting to get maybe one hydrologist," said Jeanne Masquerier, resources officer for the Tahoe-National Forest.

"So the timber planners are churning out the work and the hydrologists are running around like chickens with their heads cut off trying to keep up."

And once a problem occurs, good luck trying to fix it. "Congress appropriates very little money for watershed restoration," said Cawley, the Plumas hydrologist. "We usually have to get it out of timber sale revenues."

And that stirs more controversy. "What it amounts to is the Forest Service has to destroy the land in order to save it," said Linda Blum, an environmental consultant and former habitat specialist with the National Audubon Society.

The Forest Service is not alone in its struggles.

"Today, erosion from forests, farms and ranches, abandoned mines, roads and other sources — on public and private land — is easily the biggest water quality problem in the mountains. To date, no government agency — federal, state or local — has been able to stop it."

This story is much the same across the rest

of California, and the nation as well.

"The sheer magnitude of the pollution dwarfs the resources available to deal with it," said a 1990 report by the General Accounting Office, the investigative arm of Congress.

"While available funding is on the order of millions, serious efforts to correct the problem — even specific problems in limited geographic areas — would cost billions."

In the Sierra, too little money and manpower have left gaping holes in state water quality programs.

"The bottom line is we've got one or two people covering the counties from Tuolumne all the way up to Butte," said Barry Montoya, an environmental specialist with the Central Valley Regional Water Quality Control Board.

"And we've got the Forest Service submitting timber harvest reviews, plus the California Department of Forestry. There's a lot of work to be done."

"But I'm not sure the Forest Service is the biggest perpetrator. You can drive up into the foothills where a person may own three or four acres and he's overgrazed it, where developers are ripping up the landscape."

"And there's nobody there to catch them. It's like the drug problem — there are not enough cops."

Few places in the Sierra have suffered as much as Last Chance Creek.

The view is devastating: barren, rubble-strewn slopes, creeks filled with gravel, bushes half-buried in sand. Not long ago, this region was forested. Now it is turning to desert.

"Look at here," said Kossow, the hydrologic technician, riding along in the passenger seat of a Jeep that crawls along a steep road above the creek. "They didn't leave anything. They've probably set this soil back thousands of years."

MAJESTY AND TRAGEDY  
**THE SIERRA IN PERIL**



After large stands of forest were cut along Last Chance Creek in the Plumas National Forest, heavy rains in July 1990 washed a quarter-million tons of soil

off steep slopes, creating a moonscape of gullies and bare land. Not long ago the region was forested. Now it is turning to desert.



Sheep graze near the banks of the Stampede Reservoir in the Tahoe National Forest, raising concern over damage to aquatic habitat, riparian areas and water quality.



Dust flies during logging season. Often the area where trees are dragged for trimming is badly damaged by bulldozers.

Continued from previous page, 10

The Jeep stops and Kossov and others set out cross-country. Hiking is tough. There are gullies every few feet, knee- to hip-deep, knifing like small canyons through the crumbly granitic soil.

"I walked all this country in 1987 and there was no bedrock along this road," Kossov said. "Now you can see bedrock."

Gordon Robinson, a former forester for the Southern Pacific railroad from 1939 to 1966 who later went to work for the Sierra Club, stands behind him, staring in disbelief. "This is not mismanagement," he said. "It's no management."

Cawley, the Plumas hydrologist, said the disaster started with a fire, the enormous Clark Fire of 1987 that burned 40,000 acres

of forest and rangeland across the high, dry county of the northeast Sierra.

The scene was not pretty: large stretches of dead, fire-blackened trees. But to the Forest Service it was an opportunity to do what it does best: cut trees.

"Our fire management people wanted to get in and clean that material up — to reduce the risk of future fires," Cawley said. "And that meant getting the trees out and pushing over everything else and piling it up and burning it."

Cawley was concerned. After all, the slopes were steep and the soil was crumbly and prone to erosion.

"There's an internal debate raging," he said. "I guess you have to be there to experience it."

"I've been in many, many meetings where myself and maybe three other people were surrounded by 20 to 25 fire management and timber people who are saying, 'Yeah. Go for it. Keep going. This is great stuff.'"

"The fire folks really believe passionately in what they are saying. The problem is everybody is so impassioned we haven't gotten down to a businesslike level where we — as hydrologists — can say, 'OK, we have to get rid of some of this material, but let's look for machines that are kinder to the land than a bulldozer with a blade on it.'"

But former district ranger Hammond said that if Cawley was concerned, she didn't hear about it.

"Ken Cawley — and specialists of his ilk — were part of our environmental assessment

process," she said. "Frankly, I didn't get a sense they were uncomfortable with it."

"Nobody said to me, 'I can't live with what you guys are proposing.' I truly felt it was a solution everybody was comfortable with."

After the rainstorm at Last Chance Creek, Cawley was stunned.

More than 1,700 acres of Forest Service land was ravaged. "It was serious, serious erosion," he said. "I would call it a devastated site."

His 12-page internal report was something of a sensation inside the Forest Service — and out — because he pointed a finger at his own agency.

"Traditionally, we've regarded these storms as freak events," he said. "The argument I've heard is, 'We rolled the dice and — against the odds — we lost.'"

"But it's a well-known fact that this is a high-lightning occurrence area and a high-intense thunderstorm occurrence area. We've had two of these things in the same place in successive years. How odd are they?"

"The point I was trying to make is that in some of these areas, there are certain types of soil and climate conditions where if we roll the dice, we may lose six times out of 10."

He also drew attention by showing that erosion from heavily logged areas vastly exceeded soil loss from undisturbed areas, even undisturbed areas that had been burned.

"It sounds like a prescription for disaster," said Henry Vaux, a professor emeritus of forestry at the University of California, Berkeley, and chairman of the California Board of Forestry from 1970 to 1983.

"There's no excuse for that. Somebody ought to be dangled from the yardarm for approving it."

But Cawley said there were no regrets. "I think the range district was put in a defensive position. Questions have been raised. But there was nothing ever close to anybody ever being punished or anything," he said.

"We have a lot to learn," said Hammond. "I guess that's part of the conclusion we're coming to."

"We're taking it one step further," she said. "We've formed a group to apply our 'new perspectives' program on these areas because obviously what we're doing isn't working."

"We're talking about looking at a process that's driven by an objective different than what it's been driven by — which is to harvest timber."

Cawley said the controversy "is symptomatic of the cathartic change the Forest Service is going through. It's both exciting and painful."

"The old mission was to get the sticks out. And my view is that Last Chance Creek was basically old forestry. You come in and pile up the sticks and burn 'em go."

Change is coming, but slowly. "We've got new buzzwords — 'new perspectives' and so forth," Cawley said. "They always get the motto going first and then hopefully the program comes along afterward. . . . Basically, we haven't defined our new mission yet in a way that everybody understands and has bought into."

"But I think there is change afoot. There's an old saying that people learn more from their mistakes than their successes. That may be the process at work here."



Near Last Chance Creek, a culvert is nearly buried in sediment, the aftermath of severe soil erosion from heavily logged slopes near Black Mountain in the Plumas National Forest.

By Tom Knudson

## Once an oasis, now a desert

"I cut through steep mountains, I split rocks, opened passages and constructed a straight road for the cedars . . . high and strong, of precious beauty and of excellent dark quality, the abundant yield of Lebanon." — Nebuchadnezzar II of Babylon, 604-562 B.C.

By Tom Knudson  
 Bee Sierra Bureau

Some 5,000 years ago, a nomadic people stumbled out of the desert onto a strip of Mediterranean coast. The land was lush, an oasis of green with running creeks, according to one account.

The Phoenicians put the land to work, cutting the great cedars, building ships, grazing livestock and building a thriving civilization. Today, that oasis is a wasteland we call Lebanon. Centuries of deforestation and overgrazing have turned its green hills brown, ruined its rivers and depleted its soil.

Some 150 years ago, a nomadic people stumbled out of the desert onto a lush strip of Pacific coast. The land was so rich they called it "the Golden Land."

The settlers put the land to work, cutting its great trees, building homes, grazing livestock and building a thriving civilization.

Today, the golden land is no longer so golden. Logging, grazing and other activities are turning large parts of its forest brown, spoiling its rivers and depleting its soil.

California is not Lebanon. But California is young.

"This is absolutely no reason to believe we're going to be any different than any other culture," said Michael Jackson, an attorney and conservationist in Quincy.

"We're using heavy equipment, more destructive methods than anybody who lost their forest a thousand years ago. It may go quicker, not slower."

The problem is called desertification. And the Sierra Nevada, with its erosion-prone soils and sun-baked, Mediterranean summers, is an open door for desert.

"Many Americans believe desertification is a 'Third World' problem," said Michael Gillett, a senior scientist at the National Center for Atmospheric Research. "Yet aspects of desertification are under way in our country. One such place is the Sierra Valley, north of Truckee."

"When you drive through the Sierra Valley, you see a forest on the west side, and very little on the north and the east," Jackson said. "Older people remember when the forest was 20 miles farther east. The peaks were covered with tall, stately trees. And today, nothing's coming back."

"Those trees grew under a canopy for a millennium. We took away that canopy. The soil became too hot. The microbes got baked. And now something is missing."

# Mines foul Sierra streams

## Poisons from sites exact a heavy toll

By Tom Knudson

**S**LATE CREEK, Sierra Co. — With names like Lucky Hill, Whiskey Ridge and Pioneer Pit, this part of the Sierra Nevada almost seems to clank and clatter with the sound of a colorful gold rush past.

But mining has brought more than history to the Sierra. It has also brought one of the biggest water quality problems in the mountains.

"I abandoned mines from more than a century old — continue to bleed a steady stream of pollution into mountain rivers, from ordinary silt and gravel to acidic wastes and toxic heavy metals such as arsenic and mercury.

"The poisons are taking a grim toll, especially on fish and aquatic life. In some places, streams have been sterilized. Elsewhere — such as here at Slate Creek — aquatic habitat has been severely damaged and trout are hard to find. And now, some scientists are concerned about human health, too.

"One of the big concerns is mercury, which has been found in fish in Sierra streams at levels higher than those considered safe for aquatic life, in one place, human health.

"Remarkably, the issue has drawn little attention from lawmakers, regulatory agencies or industry. Too often, it seems, pollution from old mines is considered "out of sight, out of mind," as one state official put it.

"The problem is there, and growing. Every year, more mercury bleeds into Sierra watersheds. Every year, the state's most important source of food gets a little dirtier.

"Today, frustration is growing.

"These are big problems," said Barry Montoya, an environmental specialist with the Central Valley Air Quality Control Board.

"And what the solution is, God only knows."

"Marcia Keesey is frustrated, too. Keesey, an assistant engineering geologist with the California Water Quality Control Board, is trying to put together an inventory of abandoned mines in California. But there's a hitch: She has no money.

"There's no program set aside for abandoned mines, even though everyone recognizes there's a problem here," she said.

"So we end up having to compete with other types of pollution problems. And invariably, that doesn't work very well."

"Most funding goes toward things that impact human health. Even though we may feel bad when fish get killed, it doesn't have as much impact as when it affects human health."

"She has pleaded her case with both the U.S. Environmental Protection Agency and the state Legislature with no luck."

"My budget is basically nothing," she said. "I have my time. I can talk to people. But for as long as trying to get together a field assessment, it's been an uphill struggle."

"One of the few on-the-ground abandoned mine inventories ever completed in the Sierra took place here last summer along Slate Creek, a lone stream that tumbles into the North Yuba River just above New Bullards Bar Reservoir. The results were not encouraging."

"When we began, we knew of about 48 mine sites along the creek," said Terry Benoit, chief hydrologist for the Plumas National Forest, which conducted the study. "When we finished, we had identified 95."

"There are all these little mines that people just never got on the books," he said. "It's a festering problem that has been out there for ages and we've just ignored it."

"A drive along Slate Creek can be depressing. At Pioneer Pit, ridges torn up by 19th century hydro-

electric plants are still visible. The funnel for most of the sediment in the east branch of the north fork of the Feather River. On the east branch, PG&E has found that one particular tributary is causing environmental problems: Indian Creek.

"One of the major problems is logging, and road building associated with logging," said Larry Harrison, a project manager with PG&E's hydro-generation department. "Then, you have forest fires, livestock grazing and other kinds of road building."

Harrison also is project manager for PG&E's Rock Creek-North Fork Feather River erosion control program. In other words, he manages erosion control.

"There's a lot of silt that goes through the turbines and that, of course, increases annual overhead and maintenance costs," he said. "But it also poses a potential hazard to the operation of the dams themselves. It can clog the water gates that operate what we call drum gates, and you could end up dumping the whole reservoir."

For PG&E — and its ratpacers — mud costs money. Lots of money. "To totally dredge both reservoirs would cost about \$100 million," Harrison said. "What we're proposing is partial dredging, about a million cubic yards, until we can figure out other possible solutions."

PG&E's problem, though serious, is but a drop in a very muddy bucket. Throughout the Sierra, silt is tumbling downhill toward the most elaborate water storage system in the country — the State Water Project and the Federal Central Valley Project. In the end, it may not be drought that slows the throttle of California. It is silt.

"This sort of thing is reducing the lifetime of the hydropower and water distribution system in California to the order of a half," said Robert Currier, a professor of environmental geology at the University of California, Santa Cruz.

"In other words, we have half the lifetime for the dams that we had when we designed them."

But Bob Strand, head of the sedimentation section of the U.S. Bureau of Reclamation, said, "I don't know. My gut feeling is that sounds a little strong."

Facts and figures are hard to come by, in part because the bureau has traditionally worried more about sedimentation in the highly erosive Colorado River region. This spring, though, the agency is coming to the Sierra Nevada for a first-ever survey of sedimentation at Folsom Lake on the American River.

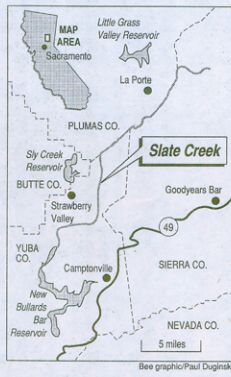
"The interest was strong enough," Strand said. "We want to know what the capacity is."

"Eventually, they're all going to fill up. It's something this country is going to have to face. Most of our major storage structures are getting up in years — and we're losing that storage space."

Downstream from Rock Creek and Cresta is the bold, blue wink of Lake Oroville — the largest state-owned reservoir in California.

"I know that DWR — the California Department of Water Resources — has some concerns about siltation in the Sierra area of Lake Oroville," Harrison said.

"There's definitely a problem everywhere we look. Every reservoir everywhere is filling up. It's just a matter of how much space there is and how long it's going to take."



Bee graphic/Paul Dugnick

Environmental Protection Agency and the state Legislature with no luck.

"This spring, as snowmelt flushes more mine wastes out of the mountains, Keesey sits at a desk in Sacramento.

"My budget is basically nothing," she said. "I have my time. I can talk to people. But for as long as trying to get together a field assessment, it's been an uphill struggle."

"One of the few on-the-ground abandoned mine inventories ever completed in the Sierra took place here last summer along Slate Creek, a lone stream that tumbles into the North Yuba River just above New Bullards Bar Reservoir. The results were not encouraging."

"When we began, we knew of about 48 mine sites along the creek," said Terry Benoit, chief hydrologist for the Plumas National Forest, which conducted the study. "When we finished, we had identified 95."

"There are all these little mines that people just never got on the books," he said. "It's a festering problem that has been out there for ages and we've just ignored it."

"A drive along Slate Creek can be depressing. At Pioneer Pit, ridges torn up by 19th century hydro-

electric plants are still visible. The funnel for most of the sediment in the east branch of the north fork of the Feather River. On the east branch, PG&E has found that one particular tributary is causing environmental problems: Indian Creek.

"One of the major problems is logging, and road building associated with logging," said Larry Harrison, a project manager with PG&E's hydro-generation department. "Then, you have forest fires, livestock grazing and other kinds of road building."

Harrison also is project manager for PG&E's Rock Creek-North Fork Feather River erosion control program. In other words, he manages erosion control.

"There's a lot of silt that goes through the turbines and that, of course, increases annual overhead and maintenance costs," he said. "But it also poses a potential hazard to the operation of the dams themselves. It can clog the water gates that operate what we call drum gates, and you could end up dumping the whole reservoir."

For PG&E — and its ratpacers — mud costs money. Lots of money. "To totally dredge both reservoirs would cost about \$100 million," Harrison said. "What we're proposing is partial dredging, about a million cubic yards, until we can figure out other possible solutions."

PG&E's problem, though serious, is but a drop in a very muddy bucket. Throughout the Sierra, silt is tumbling downhill toward the most elaborate water storage system in the country — the State Water Project and the Federal Central Valley Project. In the end, it may not be drought that slows the throttle of California. It is silt.

"This sort of thing is reducing the lifetime of the hydropower and water distribution system in California to the order of a half," said Robert Currier, a professor of environmental geology at the University of California, Santa Cruz.

"In other words, we have half the lifetime for the dams that we had when we designed them."

But Bob Strand, head of the sedimentation section of the U.S. Bureau of Reclamation, said, "I don't know. My gut feeling is that sounds a little strong."

Facts and figures are hard to come by, in part because the bureau has traditionally worried more about sedimentation in the highly erosive Colorado River region. This spring, though, the agency is coming to the Sierra Nevada for a first-ever survey of sedimentation at Folsom Lake on the American River.

"The interest was strong enough," Strand said. "We want to know what the capacity is."

"Eventually, they're all going to fill up. It's something this country is going to have to face. Most of our major storage structures are getting up in years — and we're losing that storage space."

Downstream from Rock Creek and Cresta is the bold, blue wink of Lake Oroville — the largest state-owned reservoir in California.

"I know that DWR — the California Department of Water Resources — has some concerns about siltation in the Sierra area of Lake Oroville," Harrison said.

"There's definitely a problem everywhere we look. Every reservoir everywhere is filling up. It's just a matter of how much space there is and how long it's going to take."

lic mining have yet to heal. Every winter, rain and wind weep the woods, peeling away more sediment. The most wrenching is that of a tiny creek that drains the pit. The creek runs orange with mine wastes.

Across road is another eyesore — the defunct Gardner's Point mine. "Gardner's Point is a disaster," Benoit said. "It has eroded so badly that at one time there was a road around the top of the site. And the road is gone now."

"Slate Creek is not a healthy watershed. The fishery is very, very poor. In fact, there's almost no habitat left. It's all been covered in silt. And there's also some suspicion about poisoning."

Mercury does not occur naturally in the Sierra. So where is it coming from?

The answer, apparently, is old mine operations, which imported tons of the metal to extract gold and then carelessly disposed of it, often along creeks.

"There are records of mercury being taken up by these mines and used," said Montoya of the Central Valley water quality control board. "And there are no records of mercury ever coming out again."

A recent report by Montoya's agency contains worrisome news: Mercury is getting into the food chain.

Specifically, the report identified seven Sierra streams, lakes and reservoirs where levels of mercury in fish exceed the amount considered safe for aquatic life by the National Academy of Sciences: the Feather River, Feather River, Lower American River, Mokelumne River, Pardee Reservoir, Don Pedro Reservoir and Lake McClure. And in the Yuba River, mercury levels were high enough to exceed the U.S. Food and Drug Administration standard considered safe for protecting human health.

Mercury is of special concern because it accumulates in the food chain and can cause damage to humans, even at minute dosages. It causes tremors and memory loss, as well as brain damage in developing fetuses.

"A typical mining procedure was to take the waste rock — and there was a lot of mercury left in the waste rock — and dump it in Mother Nature's creek bed," Montoya said.

It is one thing to talk about the pollution, it is another to live with it.

For more than two decades, Jim Holden has been living dredging specks of gold from fast-moving Sierra streams.

For more than two decades, he has watched mercury pour out of the mines and into the creek bed. "I can show you a hole on the river where you can actually step in mercury. It slops up on your boot," said Holden, who works the middle fork of the Yuba River.

"I've found tunnels just full of mercury. It drips down from one place to another. And then you get a storm and those tunnels get flooded and it just pushes that mercury out into the river."

"Hydrophobic soil." A layman might think it scorched earth.

"Ever since Smokey the Bear arrived, we've had a tremendous accumulation of wood and fuel in our forests," explained plant ecologist Bob Holland. "So when a fire does take place, you get a holocaust. It just burns the soil."

"The temperatures in the soil — the decomposing needles and twigs — can climb to 1,000 degrees. You end up with this resinous stuff in the ground — like a layer of wax."

"When the rains come, water will move through the soil until it hits that layer. It can't go any further, so it moves laterally. Eventually, it turns to slurry and the whole thing slides downhill."

"This is how it must have been: Footsteps in a lush mountain meadow, the flash of fast water, a long cast — and trout over a campfire."

This is how it is today at Willow Creek in Plumas County. Footsteps in a mountain meadow, the gash of a 30-foot-wide gulch, chunks of soil tumbling into the creek — and dinner in town.

It is the story of Willow Creek, a mountain stream riddled by livestock grazing. And it is a common tale, especially in the southern and eastern Sierra.

"Grazing began along Willow Creek long ago. But it wasn't until 1986 — after decades of abuse by cattle — that Willow Creek turned from sparkling stream to soil-choked gulch."

A heavy storm produced the region, sending a torrent of water surging down the creek's raw, cattle-trodden banks. Afterward, Kossow arrived to take a look. "There was this huge gully," he said. "The stream was swallowing up the meadow. I told one of my friends. And he couldn't believe my physical description."

"He said his dad used to take him fishing in that stream. They used to catch some really nice fish. It was one of their favorite spots."

"They flattened that stream, knocked it apart," said Tahoe fisheries biologist Ron Meyer. "Your dense riparian vegetation — the moss, ferns and so on — isn't going to come back for years."

"Medel's story is typical."

"I can't just one little spot," said Don Erman, professor of aquatic ecology at the University of California, Berkeley. "It's much more widespread. And it's our land — not Forest Service land. It belongs to all of us."

Two years ago, Mill Creek was home to a healthy population of rainbow trout. Then, clear cutting began.

Heavy logs were hauled through the creek, ripping up its banks and gravel bottom. Later, rain washed soil off the steep slopes, lining the creek with mud, burying the gravel bottom where trout spawn. When Medel returned to Mill Creek this spring, the trout were gone.

"Once majestic skies are filled with pollution. An emerald forest is sick and brown. Soil is washing away. Streams are lined with mud. People are moving in — and wildlife is moving out."

Today, though, things are starting to change. Concern is growing, rumbling like a summer thunderstorm along the Sierra crest. You can hear it in mountain towns from Quincy to Camp Nelson, even campfires along the John Muir Trail, even in some quarters of the U.S. Forest Service.

"Today, though, things are starting to change. Concern is growing, rumbling like a summer thunderstorm along the Sierra crest. You can hear it in mountain towns from Quincy to Camp Nelson, even campfires along the John Muir Trail, even in some quarters of the U.S. Forest Service."

"Today, though, things are starting to change. Concern is growing, rumbling like a summer thunderstorm along the Sierra crest. You can hear it in mountain towns from Quincy to Camp Nelson, even campfires along the John Muir Trail, even in some quarters of the U.S. Forest Service."

"Today, though, things are starting to change. Concern is growing, rumbling like a summer thunderstorm along the Sierra crest. You can hear it in mountain towns from Quincy to Camp Nelson, even campfires along the John Muir Trail, even in some quarters of the U.S. Forest Service."

"Today, though, things are starting to change. Concern is growing, rumbling like a summer thunderstorm along the Sierra crest. You can hear it in mountain towns from Quincy to Camp Nelson, even campfires along the John Muir Trail, even in some quarters of the U.S. Forest Service."

"Today, though, things are starting to change. Concern is growing, rumbling like a summer thunderstorm along the Sierra crest. You can hear it in mountain towns from Quincy to Camp Nelson, even campfires along the John Muir Trail, even in some quarters of the U.S. Forest Service."

"Today, though, things are starting to change. Concern is growing, rumbling like a summer thunderstorm along the Sierra crest. You can hear it in mountain towns from Quincy to Camp Nelson, even campfires along the John Muir Trail, even in some quarters of the U.S. Forest Service."

"Today, though, things are starting to change. Concern is growing, rumbling like a summer thunderstorm along the Sierra crest. You can hear it in mountain towns from Quincy to Camp Nelson, even campfires along the John Muir Trail, even in some quarters of the U.S. Forest Service."

"Today, though, things are starting to change. Concern is growing, rumbling like a summer thunderstorm along the Sierra crest. You can hear it in mountain towns from Quincy to Camp Nelson, even campfires along the John Muir Trail, even in some quarters of the U.S. Forest Service."

"Today, though, things are starting to change. Concern is growing, rumbling like a summer thunderstorm along the Sierra crest. You can hear it in mountain towns from Quincy to Camp Nelson, even campfires along the John Muir Trail, even in some quarters of the U.S. Forest Service."

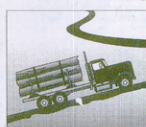
"Today, though, things are starting to change. Concern is growing, rumbling like a summer thunderstorm along the Sierra crest. You can hear it in mountain towns from Quincy to Camp Nelson, even campfires along the John Muir Trail, even in some quarters of the U.S. Forest Service."

"Today, though, things are starting to change. Concern is growing, rumbling like a summer thunderstorm along the Sierra crest. You can hear it in mountain towns from Quincy to Camp Nelson, even campfires along the John Muir Trail, even in some quarters of the U.S. Forest Service."

## From forest to desert

A host of forces is bringing remarkable damage to the very essence of the mountains: soil and water. Logging is flushing millions of tons of mud and debris off of steep slopes — ruining once-clear trout streams. Cattle are trampling through mountain meadows, turning wetlands to desert. Roads are ripping up fragile mountain soil and channeling rain and melting snow into highly erosive torrents. And catastrophic forest fires are bringing a legacy of scorched earth to the mountains.

### Effects of road building



John Caspano, a water quality specialist for the Plumas National Forest, couldn't believe it.

"There was an old logging road," he said. "It was only a mile long but it had four major washouts. One of them was 60 feet across and 30 feet deep. And that was a little one."

His story is not unusual.

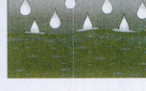
"Roads are the big problem," said Jim Siesta, forest practices review coordinator for the California Department of Fish and Game. "If you've got a lot of roads, you've got a lot of problems."

The Sierra has a lot of problems. In national forests, you can drive more than 19,000 miles — about three-quarters the distance around the world — mostly on logging roads.

"When you look at aerial photos, it's astounding," said Mike Kossow, a Plumas hydrologic technician. "It looks like a million little worm trails down there."

Often, roads are poorly designed. But even good roads cause problems. "It's very difficult to put enough protection into roads to not have them literally got over a thousand road problems on this forest — and we're just typical," said Terry Benoit, chief hydrologist for the Plumas.

### Hydrophobic soils



After the Clark Fire swept through Black Mountain in 1987, Mike Yost noticed something unusual.

"You could take a canleen and pour water on the ground and it would just bead up and roll off," said Yost, a forestry instructor at Feather River College in Quincy.

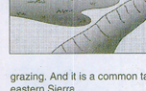
Today, a new generation of super-hot fires is causing fresh changes to mountain soil — and triggering enormous soil erosion. Scientists call the problem "hydrophobic soil."

"A layman might think it scorched earth. Ever since Smokey the Bear arrived, we've had a tremendous accumulation of wood and fuel in our forests," explained plant ecologist Bob Holland. "So when a fire does take place, you get a holocaust. It just burns the soil."

"The temperatures in the soil — the decomposing needles and twigs — can climb to 1,000 degrees. You end up with this resinous stuff in the ground — like a layer of wax."

"When the rains come, water will move through the soil until it hits that layer. It can't go any further, so it moves laterally. Eventually, it turns to slurry and the whole thing slides downhill."

### Erosion from grazing



This is how it must have been: Footsteps in a lush mountain meadow, the flash of fast water, a long cast — and trout over a campfire.

This is how it is today at Willow Creek in Plumas County. Footsteps in a mountain meadow, the gash of a 30-foot-wide gulch, chunks of soil tumbling into the creek — and dinner in town.

It is the story of Willow Creek, a mountain stream riddled by livestock grazing. And it is a common tale, especially in the southern and eastern Sierra.

"Grazing began along Willow Creek long ago. But it wasn't until 1986 — after decades of abuse by cattle — that Willow Creek turned from sparkling stream to soil-choked gulch."

A heavy storm produced the region, sending a torrent of water surging down the creek's raw, cattle-trodden banks. Afterward, Kossow arrived to take a look. "There was this huge gully," he said. "The stream was swallowing up the meadow. I told one of my friends. And he couldn't believe my physical description."

"He said his dad used to take him fishing in that stream. They used to catch some really nice fish. It was one of their favorite spots."

### Siltation of streams



An avalanche would have been kinder.

In 1990, clear cutting brought a great transformation to the Mill Creek area of the Tahoe National Forest: Woodland turned to wasteland. Some of the worst damage, though, took place where one might least expect it — in Mill Creek itself.

"They flattened that stream, knocked it apart," said Tahoe fisheries biologist Ron Meyer. "Your dense riparian vegetation — the moss, ferns and so on — isn't going to come back for years."

"Medel's story is typical."

"I can't just one little spot," said Don Erman, professor of aquatic ecology at the University of California, Berkeley. "It's much more widespread. And it's our land — not Forest Service land. It belongs to all of us."

Two years ago, Mill Creek was home to a healthy population of rainbow trout. Then, clear cutting began.

Heavy logs were hauled through the creek, ripping up its banks and gravel bottom. Later, rain washed soil off the steep slopes, lining the creek with mud, burying the gravel bottom where trout spawn. When Medel returned to Mill Creek this spring, the trout were gone.

### THE SERIES

**SUNDAY:** California's Sierra Nevada — one of the world's great mountain ranges — is suffering a slow death.

But at many places where you look there are problems: polluted air, dying forests, poisoned rivers, vanishing wildlife, eroding soil and rapid-fire development. Even naturalist John Muir's holy ground, Yosemite National Park, is hurting.

The vulnerability was documented in an eight-month investigation by The Bee, involving more than 200 interviews.

To 100 miles of travel and the examination of a small mountain of documents.

**TUESDAY:** The Sierra Nevada forest is dying. Logging is the most visible and controversial agent at work in the Sierra. But air pollution, drought and insects are inflicting great damage, too. And there is one other problem — more subtle than the rest — causing enormous harm: fire suppression.

Millions of acres in a sieve, Sierra trees are falling — and falling fast. The battlegrounds are many: North Mountain, Cluer Canyon, Black Mountain, Red Clou Canyon. In its toughest hour, the Sierra Nevada forest can find little mercy.

**TODAY:** Along the back roads of the Sierra Nevada is a battered and bleeding land, places where trees, grass and other vegetation have been peeled away and soil is washing into mountain streams at staggering rates.

The problem draws little attention, though, partly because gullies — unlike spotted cows — are not very glamorous. The Bee's investigation found that damage to soil and streams is perhaps the most serious and overlooked problem in the Sierra Nevada, one that threatens the essence of the range and the lifeblood of California — mountain watersheds.

**TODAY:** Along the back roads of the Sierra Nevada is a battered and bleeding land, places where trees, grass and other vegetation have been peeled away and soil is washing into mountain streams at staggering rates.

The problem draws little attention, though, partly because gullies — unlike spotted cows — are not very glamorous. The Bee's investigation found that damage to soil and streams is perhaps the most serious and overlooked problem in the Sierra Nevada, one that threatens the essence of the range and the lifeblood of California — mountain watersheds.

**TODAY:** Along the back roads of the Sierra Nevada is a battered and bleeding land, places where trees, grass and other vegetation have been peeled away and soil is washing into mountain streams at staggering rates.

The problem draws little attention, though, partly because gullies — unlike spotted cows — are not very glamorous. The Bee's investigation found that damage to soil and streams is perhaps the most serious and overlooked problem in the Sierra Nevada, one that threatens the essence of the range and the lifeblood of California — mountain watersheds.

# The planting of forests called a failure

By Tom Knudson  
 Bee Sierra Bureau

The Sierra forest of tomorrow looks nothing like today's.

The future forest is a tree farm — row after row of pine trees, sprouting like soybeans in a farmer's field. Swirling about this future forest, a creation of the U.S. Forest Service, is a cloud of question and controversy and the hint of herbicides drifting through the air.

"As I look at those stands, I think we can be criticized," said David Jay, deputy regional forester for the Forest Service. "We did not, at the time, give enough credence to multiple species. We felt there would be other parts of the forest that would be ample to provide that kind of diversity."

When a farmer plants a soybean field, it usually grows. When the Forest Service plants a stand of pine, the trees look for an excuse to die: sunstroke, thirst, lack of nutrients, too much brush, decapitation by gophers and crows.

In the Sequoia National Forest, less than 20 percent of the acreage replanted between 1970 and 1986 was certified as successfully restocked. One internal memorandum calls the situation "alarming."

The Forest Service is having an extremely difficult time replanting trees," said Carla Cloer, a fifth-grade teacher at the Porterville Elementary School and a well-known conservationist in the Sequoia region.

"The real problem is they're logging where they shouldn't be logging. Some areas of the forest only get 14 inches of rain a year. The soils are shallow and erosive and extremely vulnerable."

But Sequoia forest expert Bob Rogers pointed more to faulty record-keeping, saying that he expects most of the replanted areas to eventually be certified as successful.

But concerns about replanting are not confined to the Sequoia forest.

Throughout the Sierra, especially the dry southern and eastern portions, you will find a future forest that is dead and dying.

"You come out here in the summer and it looks like the Mojave Desert," Roy Butler, chairman of the Nevada County Fish and Wildlife Commission, said on a recent drive through a replanted section of the Tahoe National Forest near Truckee.

"The survival rate can't be one tree in 50. And some of these areas have been planted two times. It will take centuries for these forests to come back. It's bleak, really bleak."

But the Forest Service says things are improving. "We've made some mistakes," Jay said. "We've thought we could make a change and bring it back — and we couldn't."

"I believe we're being much more careful today about the areas we're planning to harvest. And there has been extensive research into helping us do a better job with regeneration."

In April, the U.S. General Accounting office criticized the Forest Service for not paying enough attention to reforestation.

"Our report shows that the Forest Service's reporting on reforestation is inaccurate and inconsistent," said GAO Associate Director Flora Milans at a House subcommittee hearing.

"As a result, Congress does not have reliable information to make informed decisions on funding for forest management."

Not long ago, plant ecologist Bob Holland walked out into a stand of brush north of Truckee and found something alarming: a pygmy forest.

"There were all these little trees, maybe a foot or two tall and as big around as your thumb," said Holland, who recently left his job with the California Department of Fish and Game. "But when you cut them and count the rings, you find they are 30 years old."

"They have just been entirely suppressed by the closed canopy of the brush."

Brush may seem boring, but it is a major enemy in the national forest. Brush is an executioner of young trees — and it is running wild.

This year, though, the Forest Service plans to unveil a special weapon against brush, one it hasn't used in years: "We want to use herbicides," Jay said. "They can be used on private land and the amounts we're talking about are minuscule in comparison."

Conservationists are outraged. "What they'll be doing is putting herbicides in the public water supply," contends Steve Beckwith, co-director of the Sierra Biodiversity Project.

"You can choose whether or not to buy pesticide-contaminated produce. But if you drink water out of the Sierra, you won't have a choice. It will have herbicides in it."

Even when seedlings are healthy, they can cause controversy. "You're looking at a tree farm, a monoculture," Nevada County's Butler said. "Where's the biodiversity? The only thing here is pines."

The Forest Service says it is moving toward planting more diverse forests. But in most places, new forests are still dreary stands of even-aged pine trees — all the same species.

"The only thing worse than having them fall," said conservationist Martin Litton, "is having them succeed."

'We've made some mistakes. We've thought we could make a change and bring it back — and we couldn't.'

— Forest Service's David Jay



Ponderosa pine seedlings have been planted in rows in the Stanislaus National Forest. Critics contend that such planting methods offer no biodiversity.

Bee/Lay Mathur

## Sierra low priority for Sierra Club, critics claim

By Tom Knudson  
 Bee Sierra Bureau

JAMESTOWN, Sonora Co. — When Chuck Brewster began a grass-roots effort to limit open-pit gold mining here last year, he turned to an organization he thought would want to help: the Sierra Club. "You'd think open-pit mining in the Sierra would be a major concern to them," said Brewster, a retired banking executive. "But we couldn't get much interest."

Brewster's story is not unusual. Many people feel the Sierra Club, one of the most well-known conservation groups in the world, has fallen short in the struggle to save a number of prominent San Francisco Bay Area residents — all driven by a passion to protect the Sierra Nevada.

"We will be able to do something for the wilderness and make the mountains glad," said Muir, the club's first president. But on

the eve of its 100th anniversary, many feel the Sierra Club has lost much of its old zeal.

"The process is everything," Litton said. "Who's on the steering pole, and what committees you have to go through." Joanne Hurley, the Sierra Club's director of public affairs, shrugged off the criticism. "With 650,000 members out there, you're going to have some different viewpoints," she said.

Under the leadership of David Brower, executive director of the Sierra Club from 1952 to 1989, the organization grew into one of the nation's most powerful conservation voices. Many of its efforts to save wild areas — from Dinosaur National Monument in Colorado to Diablo Canyon in California — are legendary in the conservation community.

Today, though, many are concerned the organization has drifted so far afield that its own back yard — the Sierra Nevada — is suffering.

"The trouble is it picks up movements that are already under way," Litton said. "My God, there are plenty of other people worried about acid rain and the ozone hole. Now it's getting into urban matters. It's just not the Sierra Club anymore."

"There may be problems all over the world. But that doesn't mean you should abandon the place where you started, which



'The problem is the Sierra Club is too big, too rich, too fat and too lazy.'

— Martin Litton, former Sierra Club board member

still needs you more than ever."

But Vicky Hoover, a member of the Sierra Club's San Francisco Bay Area chapter, sees things differently. "The reason the Sierra Club has spread out its activism to new issues is because it's grown tremendously," she said. "Twenty-five years ago, it had 60,000 members. Now it has more than 600,000."

"And it has a more urban membership. Because of the growth, it's been possible to address such non-traditional issues as urban transportation without neglecting our traditional areas."

But in the Sierra foothills of Tuolumne County, where Brewster hustled to promote

his mining initiative last fall, the Sierra Club was nowhere to be found.

"They said I didn't do enough homework, that I didn't stomp around and figure out where the habitat was for this fish or that animal," Brewster said.

"Well, I didn't have the time to do all that stuff. So they didn't come out publicly in support of us. I was disappointed."

The Sierra Club's colorful magazine, *Sierra*, was also not in the area. Its November/December 1990 issue included a cover article titled "Deep Rapture, Coral Reef Diving," but nothing about Brewster's mining battle.

And that has sparked more controversy.

"Of all the magazines I receive, that's the first one I chuck," said Gordon Robinson, 80, the Sierra Club's forester from 1966 to 1979. "It seems to glow, but it doesn't say anything."

Robinson and others are calling for a return of the old *Sierra Club Bulletin*, the group's hallmarks journal published from 1893 to 1977. Unlike *Sierra*, the staid, black-and-white bulletin was filled with stories about the Sierra Nevada, including personal accounts of camping trips, climbing expeditions and other adventures.

Jonathan King, editor-in-chief of *Sierra*, said: "There are a lot of Sierra Club old-timers like Gordon around. And I'm very sympathetic to the feeling of loss they have for the club they knew."

"But it's undeniable that as the organization has grown — both geographically and in numbers — its concerns have broadened exponentially."

"Now we focus on the whole spectrum of environmental issues, in the U.S. and abroad. We're worried about toxic wastes, solid wastes, insecticides, pesticides and trade with Mexico."

But old-timers remain unswayed. "The bulletin was really on the subject," Litton said. "You can't even find the *Sierra* in *Sierra* magazine anymore."

Proposals for saving the Sierra include more land for wildlife, stricter air-quality standards, more forestry research and various plans for expanded parks and reserves.

By Randy Pench

# Remedies as diverse as the range itself

By Tom Knudsen  
 Bee Sierra Bureau

©1991 The Sacramento Bee

The Sierra Nevada, one of the world's great mountain ranges, is slowly dying — and government has done little to help it.

"Science has not come to the rescue, either. And the conservation community — with some exceptions — has shown more interest in the Brazilian rain forest than the Sierra Nevada."

Today, though, things are starting to change. Concern is growing, rumbling like a summer thunderstorm along the Sierra crest. You can hear it in mountain towns from Quincy to Camp Nelson, over campfires along the John Muir Trail, even in some quiet corners of the U.S. Forest Service.

"The Sierra Nevada is really the region where California faces its destiny," said Chris Brown, a spokesman for the U.S. Forest Service in San Francisco.

"It is probably the most stunning natural setting in California. And it is the area that is getting hit."

"You've got a whole host of stresses — drought, urbanization, air pollution and so on — coming to bear on a resource we've always thought would take care of itself. Now something we have to look at as vulnerable."

This is a story of change in the Sierra — from the ideas and plans being put forth that could help save a great outdoor citizen. The ideas are as diverse as the range itself — more land for wildlife,

stricter air quality standards, a massive increase in forestry research, better protection for giant sequoias, a large Sierra Nevada Biosphere Reserve, a Sierra Nevada commission, even a new Range of Light National Park.

The Sierra has seen this before. Many years ago, the range was a crucible of change, a fulcrum for some of the nation's most prominent conservation battles, including controversies over the logging of giant sequoias, the damming of Hetch Hetchy Valley in Yosemite National Park and the destructive mining of foothill ridges and canyons with high-pressure hydraulic hoses.

Today the Sierra is a crucible once more. And for the first time in many years, the outlook for reform seems to be improving. Consider:

■ Not yet six months into office, Gov. Wilson has announced an ambitious plan to preserve forests in the Sierra Nevada watershed, including the Sierra. The Sierra has helped "shape the California character," Wilson said. "It's common sense that preventing damage to our natural resources is much easier — and much less costly — than trying to repair poisoned wetlands or ravaged mountains."

■ In San Francisco, the new regional Council of the Forest Service is talking about sweeping changes that would put wildlife and watersheds on par with timber.

■ And in the Sierra Nevada itself, a new kind of economy is emerging — one driven increasingly by tourism and recreation.

"The Sierra is really a fertile area for change," said Don Taylor, Western region representative for the Audubon Society. "The climate is not as polarized as northwest California — it faces different kinds of struggles. Timber is a player, but not the dominant one."

"The problems have spread gradually, but the march of cancer. For years, few people even noticed. The Sierra Nevada seemed somehow immune — too big and too majestic to succumb to civilization and its pressures."

■ But its vital signs — air, water, soil, wildlife — are all in trouble. "The Sierra is being well managed for our own trying to get into the future," said Don Erman, director of the wildland resource center at the University of California, Berkeley.

■ Now, as more people come into contact with more land, they're starting to

realize it isn't. They're starting to wonder why the streams are muddy. They're seeing changes that they really don't like."

## A 'Sequoia National Preserve'

That includes Martin Litton, one of California's most well-known conservationists. A few years ago, Litton was stunned to learn that cathedral-like groves of giant sequoias — the largest living things on earth — were being leveled under a policy put into place by the Sequoia National Forest.

"The giant sequoias are monuments to God. They inspire reverence around the world," the 74-year-old Litton said.

"And here we are destroying them casually, as if they don't really count. To say nothing of the other monumental trees in the area, like the great sugar pines."

Last year, a settlement was reached between the Forest Service and conservationists, insuring greater protection for the Sequoia groves. But Litton believes it does not go far enough.

Today he is a prime mover in an effort to transfer more than 400,000 acres from the national forest to a "Sequoia National Preserve," which would make the area off-limits to logging. And he has some influential allies, including the Save the Redwoods League, the Sierra Club and Environment Now, a foundation created and

ended by Frank Wells, president of Walt Disney Co.

Litton, a key player in the effort that created Redwoods National Park in 1968, said he expects legislation to be introduced in Congress this year.

"We're making a lot of progress," he said. "The idea is to propose legislation that would create a national park. 'Until a bill is actually in hand, the Forest Service probably isn't going to be able to respond to anything specific,'" said Matt Mathes, spokesman for the agency in California.

The giant sequoias were Muir's greatest concern, Litton said. "They've been badly damaged, but we can bring them back. It's going to be a labor — a labor of love — and a hard one."

## Range of Light National Park

Even bolder ideas are being voiced in the Sierra Nevada, including the creation of the Range of Light National Park.

"The question is what we want to leave for our grandchildren and their grandchildren," said Edgar Wayburn, a Sierra Club vice president in charge of national park issues. "What kind of Earth? The Sierra Nevada is an important part of that."

The idea for a new national park is just that — an idea to propose to Congress. The Sierra Club is not pushing it. But as an idea, it has a certain sparkle.

"The concept is to take the forest and high Sierra country between Yosemite and Sequoia national parks, patch it all together into a national park and christen it with Muir's memorable description of the Sierra as the Range of Light."

But the Forest Service takes a dim view of the concept.

"The Range of Light National Park proposal is myopic because it vastly reduces services to our customers — the American public," said James Crates, forest supervisor of the Sequoia National Forest.

"The idea is simply to take that randomly drawing boundaries around millions of acres of national forests, national parks and private lands, to be preserved, meets the needs and values of the American public."

But Wayburn disagreed. "When they were created, Yosemite and Sequoia were parks in a vast sea of wilderness. Now they are islands in a vast sea of development."

"The idea, which has been floating around for years, is a simple way of trying to get greater protection of the Sierra Nevada and the national parks... established there."

## Sierra biosphere reserve

But an even greater concept also is being discussed: the creation of a Sierra Nevada Biosphere Reserve, which would encompass an enormous portion of the range from the Lake Tahoe region south to Sequoia

## National Forest.

The idea is to manage the Sierra as a geographical and ecological entity, not separate chunks of public and private land. The concept is not unprecedented. In upstate New York, for example, Adirondack Park is managed in a similar manner.

More than eight times the size of Yosemite National Park, Adirondack Park is the nation's largest designated outdoor sanctuary, a patchwork of public and private land that has been managed since 1895 under the New York Constitution as "forever wild."

Litton sees merit for such an idea in the Sierra.

"The people, the towns and so forth would stay, like they have in the Adirondack Park. You would just stop the devastation of the mountains, that's all," he said.

"We stopped hydraulic mining, didn't we? If that had gone on, there'd be nothing left. What's happening today is just as destructive, only it's more subtle."

Like a new national park, a Sierra Nevada Biosphere Reserve is a long way from reality. But a scaled-down version is under serious consideration by the Timberland Task Force, a kind of think-tank formed in 1989 by the Legislature.

One proposal, now under consideration, would establish a "bioregional management system" for a large portion of the western Sierra Nevada.

"We've been trying for years to manage by drawing lines on maps and saying this is what we're going to manage for," said Dean Carrier, the Forest Service's representative on the task force until he retired earlier this year.

"We really haven't looked at the Sierra as a whole and how it fits together. That's what the bioregion idea would do, look at things naturally rather than artificially."

"I would include all kinds of new ideas, things like mitigation banks. A mitigation bank is where you would put all the resources of the Sierra into one bank."

"So if we were to restrict Sierra Pacific from cutting on their land because we need that place for wildlife, they would be able to cut somewhere else where the wildlife values weren't as critical," said Carrier, now a senior environmental consultant with Resource Management International Inc. in Sacramento.

"We're talking about changing some basic American assumptions. But there's no better place to do it than California. Politically, the western Sierra is a super area because it's nationally known. People identify with it."

A bioregional approach may not be far off. This summer, in fact, a similar approach will be put to work as part of a pilot land management project on parts of the Tahoe National Forest.

"We're really excited," said Mike Chapel, a Tahoe National Forest wildlife biologist. "We've been talking about this for four years."

The Tahoe plan seeks to reform one of the Forest Service's most controversial activities: timber harvesting.

"In the past, our timber program has been used to drive a lot of our planning," Chapel said. "Now we're trying to implement a change in philosophy so we can look at a piece of ground and say, 'What is the desired condition of the resources in this area and how does timber fit in?'"

The plan, however, has one potentially fatal shortcoming: It applies only to public land.

"If you look at the ownership pattern here on the Tahoe, almost every other section belongs to a private individual or company," Chapel said.

"What we're trying to do now, for example, is determine what the landscape should look like for wildlife. Hopefully, we'll get some interest from private landowners. If we don't, good wildlife management is going to be very difficult, if not impossible."

## Sierra Nevada Commission

Another possible solution is a Sierra Nevada Commission.

"The Sierra is such an important resource for the state of California," said Charles Golden, chairman of the division of environmental studies and director of the Tahoe Research Center at the University of California, Berkeley.

"But there's no uniformity in how it's being treated. It's managed county by county,

parcel by parcel. And we're starting to see some real problems with erosion, the distribution of water, growth and development and so on."

"One suggestion I've made is to create a statewide Sierra Nevada Commission, similar to the California Coastal Commission. A commission could bring a more uniform approach to the regulation, use and development of the region. We just have to take a broader, longer-term view."

## Reforming timber harvesting

Timber harvesting practices themselves should be reformed, said a 1990 report by the National Research Council, an arm of the National Academy of Sciences.

"It is essential," the council said, "to design harvesting practices and systems that do not reduce long-term productivity, add unwanted sediment and debris to streams, reduce desirable wildlife habitat and other natural forest values."

"The basic fact is we just don't know enough about a lot of these things," said Henry Vaux, professor emeritus of forestry at the University of California, Berkeley, and former chairman of the California Board of Forestry.

"This country's forestry research budget has been declining at a time when the level of cutting has exploded. So it isn't surprising we've run out of information."

The National Research Council recommended a "massive revitalization of forestry research" and urged the U.S. Department of Agriculture and the Forest Service to increase funding for forestry research from \$187 million to \$427 million annually by 1995.

"The stakes here are substantial," the council said. "They include the quality of air, water and soil resources, the biological diversity of natural and managed systems and the productivity of forests, wetlands and riparian zones."

The research council's message is one that Ron Stewart, the new regional forester for the Forest Service in California, takes to heart. Stewart, in fact, keeps a copy of the council's report on the coffee table in his office in San Francisco.

"As an organization, we are really at a crossroads," Stewart said. "We are re-evaluating a lot of things."

"And a lot of what comes out is going to be shaped by the new technology that's coming out, what some of the science is telling us."

Stewart, most recently director of the Forest Service's Pacific Southwest Forest and Range Experiment Station, said he will move quickly to implement the agency's "New Perspectives" program — a nationwide effort to balance all forest resources, not just timber.

"We need to aggressively pursue New Perspectives — not just in silviculture but as a way of doing business. We need to make it a reality or we're not going to carry any credibility to see other issues."

But skepticism runs high, inside the agency and out.

"The Forest Service may not be able to change by itself," said Steve Broughter, a wilderness supervisor with the Stanislaus National Forest in the central Sierra. "I don't think we've got too much of an entrenched mentality."

But many feel that Stewart, with his research background, will be a catalyst for change.

"Ron hasn't come up through the traditional Forest Service ranks," consultant Garner said. "So he doesn't carry around the attitude. This is the way we've always done things. He's a good scientist, but he is also broad enough to see other issues."

"It's not the Forest Service that comes first with Ron. It's the resource — and what the people want. With a lot of our old-time people, it's the Forest Service that comes first. Ron looks at things in a whole different light."

One of Stewart's first trials will be juggling the volume of timber taken from national forests in California. The issue is this: As demand for timber grows dramatically in Oregon, Washington and northwest California, many are concerned the scale of logging could jump dramatically in the Sierra. But Stewart said: "We will not exceed the capacity of the land. We're working with the timber industry and others, trying to bring about adjustments that will fit the available land base."

Superior Stewart has recommended to his advisors in Washington that the volume of timber harvested from national forests in California be reduced. But he was reluctant to discuss details.

"I'm uneasy just because there's a lot of internal and external politics about the direction we're going on."

Forest Service spokesman Mathes said: "Things are in such a state of transition that it's very hard to nail down specific answers on a lot of things right now."

## Cleaning up polluted air

Another controversial subject no one seems able to resolve is air pollution.

"As more people and automobiles pour into the state every year, the cloud of ozone and other airborne toxins over the mountains grows steadily worse."

"The only way to make the mountains clean is to make the valley and the Bay Area clean," said Thomas Cahill, head of the Crocker Nuclear Laboratory at the University of California, Davis.

"Ozone is like a snake," Cahill said. "You step on it in one spot and it rises up in another spot. You have to put your feet up and down the entire length to keep it knocked out."

Cahill's solution is to close loopholes in the state's vehicle emission control program. "California has laid the groundwork for very good emission control, but there are many sources of pollution slipping through the cracks," he said.

"A large fraction of the cars on the highway don't meet emission standards. Old cars are a good example — old clunkers. California, I believe, has one of the largest old-car populations in the U.S. And diesel-powered cars and trucks continue to cause problems."

But Bill Sessa, spokesman for the California Air Resources Board, takes issue with that.

"California is only a tiny part of the problem," he said. "A much bigger problem is the sheer growth in the number of cars."

"It takes eight to 10 new cars to match the pollution output of a single car made 15 years ago. But in that time, we've seen a 50 percent increase in the number of cars, and a 65 percent increase in the number of miles they drive."

Sessa called California's emission control program the most stringent in the world. "I'm not saying there aren't places we can tighten. We're always looking for ways to tighten. But the biggest consideration is the size of the problem. The large number of cars and the increasing miles people drive."

Ozone, though, is only one problem. Another is the dingy brown haze that drifts over the mountains on most summer days.

To clear that up, Cahill would, among other things, turn to the San Francisco Bay Area. "There's a lot of sulfur being emitted — hundreds of tons per day — from petrochemical refineries in the Bay Area," he said. "We need to see other issues."

"These emissions currently do not violate California's standard for sulfur dioxide. It's coming across the Pacific Ocean is very clean. The only way we keep our air polluted is to keep polluting every day."

But Sessa said standards are already tough.

"All of California's air-quality problems can be linked to three basic chemical groups, including sulfur oxides," he said. "And we already restrict all of them to a much greater degree than anybody else in the country."

Despite the many problems, Cahill remains optimistic.

"The Range of Light can be the Range of Light again. We are lucky because the air coming across the Pacific Ocean is very clean. The only way we keep our air polluted is to keep polluting every day."

"In California, we are in control of our destiny. If we stop polluting for even a day, the Range of Light would be clean again."

The Range of Light — remember those words.

"For they are more than a vision of what once was, they are a dream of what could yet be."