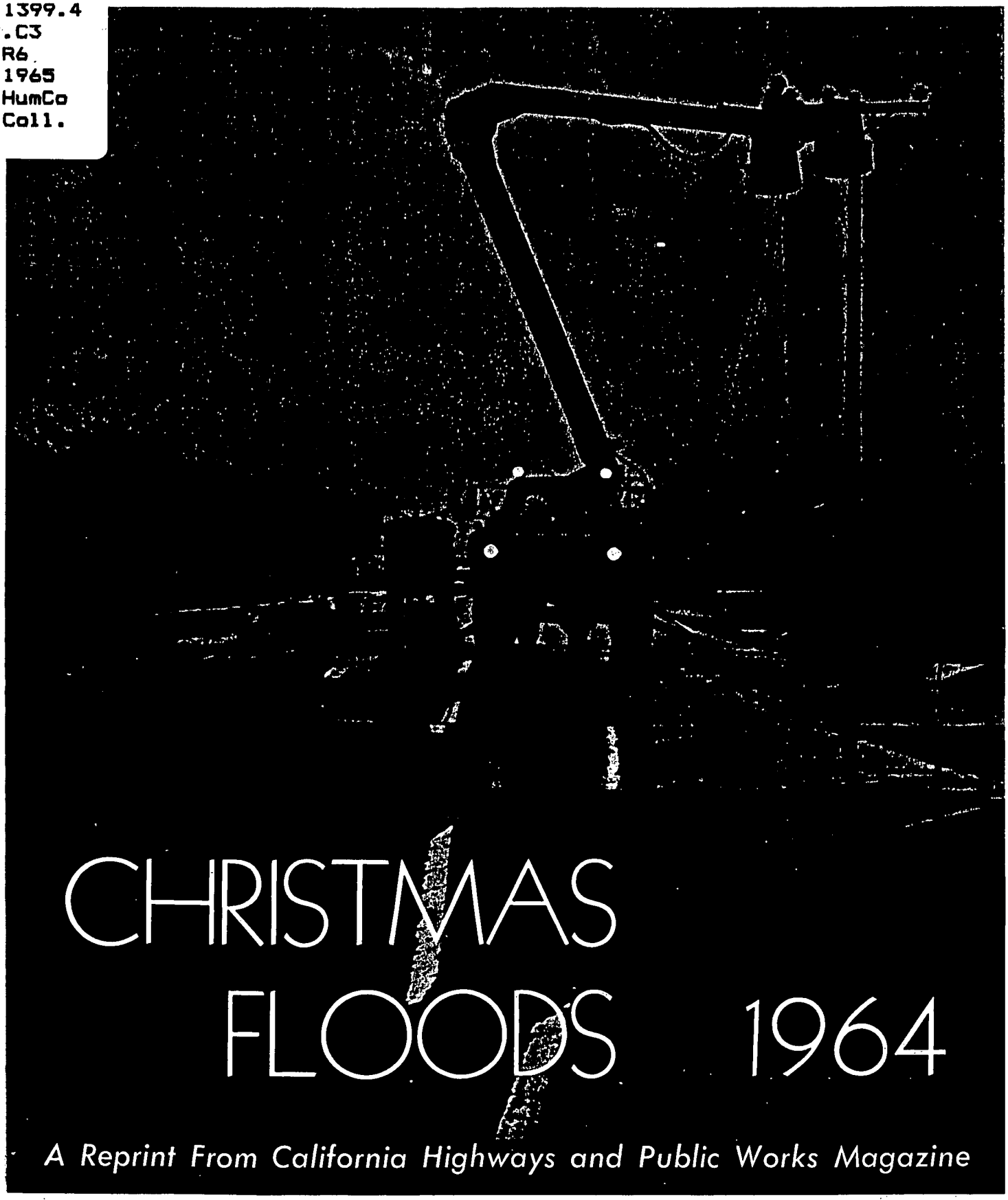
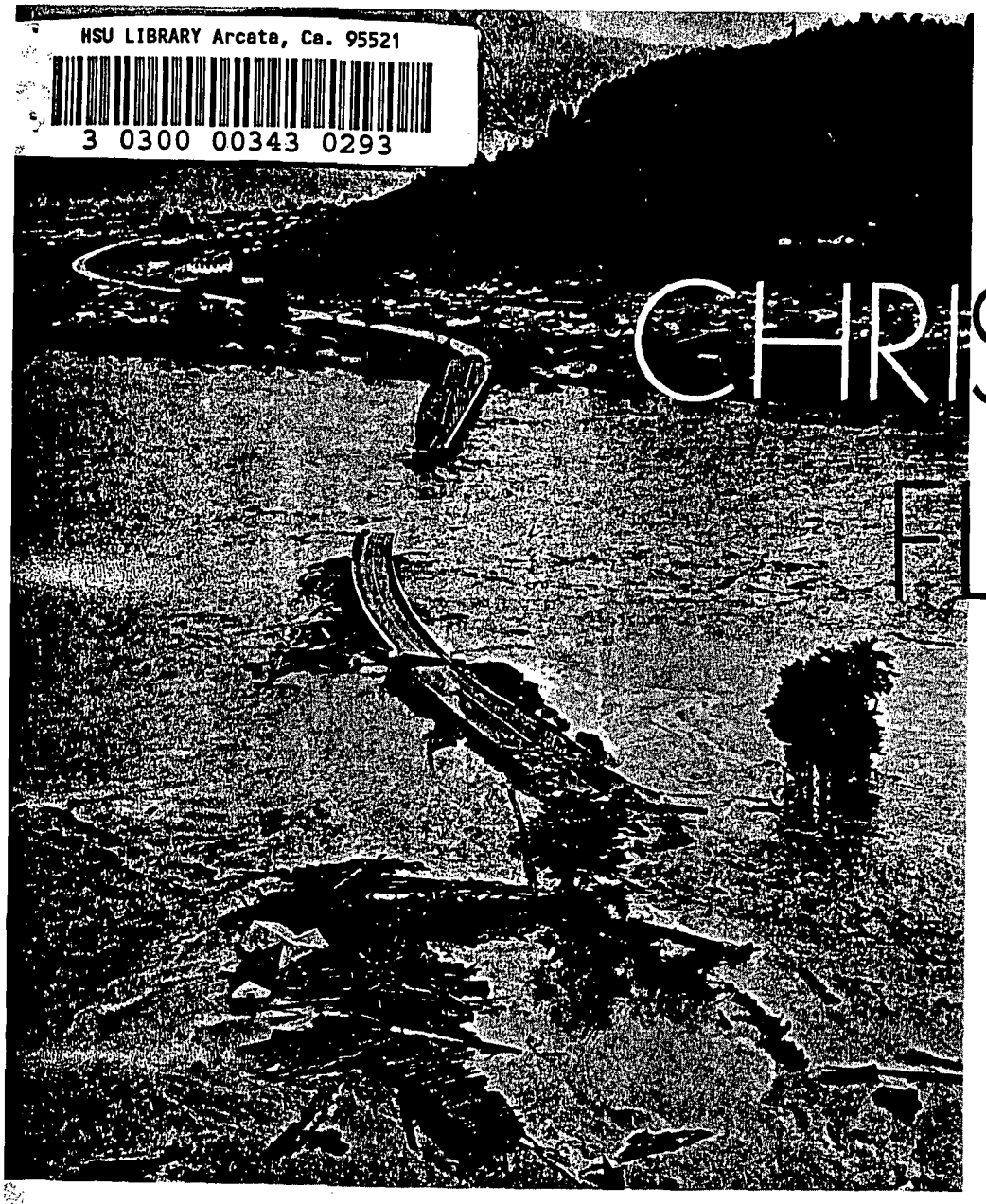


CHRISTMAS FLOODS 1964

A Reprint From California Highways and Public Works Magazine

In drumming rain, beneath low-hanging clouds, public utility crews labor at restoring electrical power in flood-stricken Humboldt County on Christmas Day, 1964. Photo was made on US 101 between Alton and Fortuna, where rampant Eel River cut new channel and tore up highway. (Photo courtesy of *Humboldt Beacon*, Fortuna.)

AUTHOR: ROBINSON, JOHN



CHRISTMAS FLOODS 1964

The Redwood Highway

By JOHN ROBINSON

Robinson Ferry (Paul Mudgett Memorial) Bridge, on US 101, at height of Christmas, 1964, flood. Eel River overflow in foreground tore great gaps in the roadway, while debris piled behind center spans caused structure failure at main stream. Note houses in debris. Town in background is Rio Dell. Redwood Highway traffic is now using county "Blue Slide" road which travels along flat at upper right. Contract for repair of bridge is well underway, and bridge is expected to be back in service by about May 1. (Photo courtesy of Eureka Newspapers, Inc.)

In the northwestern sector of California, where winter storms sweep in from the Pacific and drop rainfall approaching rain forest conditions, the narrow valleys between the ridges of the Coast Range, running north and south parallel to the coastline, are a series of troughs which collect the water. One of the area's most important rivers, the Eel, and its major tributary, the South Fork, flow northward 150 miles while only 30 miles or so from the coast. Running longitudinally through a strip subject to heavy rains, phenomenal rises and floodings are common to the river system, as would be expected.

Most of the north coast rivers follow this same pattern, except for the powerful Klamath, which cuts deeply through the Klamath Range, but the topography of its drainage is very similar to that of the Eel. Periodically, a series of fierce winter storms, spread over a broad area, drop heavy rains over the combined watersheds of these several rivers, and widespread flooding occurs.

Nine years ago, in December 1955, just before Christmas, such a series of storms struck the coast, and the resultant floods, particularly along the Eel, were the worst on record. There was considerable loss of life, and very heavy property damage.

History in the north coast counties of California seemed to be repeating itself in the last half of December 1964, when continuous rainfall saturated the Coast Range and the Klamath Mountains. Just as in the record floods of 1955, the rivers draining these ranges began to rise within their banks a few days before Christmas. Those who dwelt near the flood mark

paused in decorating their trees to listen with special attention to the weather forecasts on their radios.

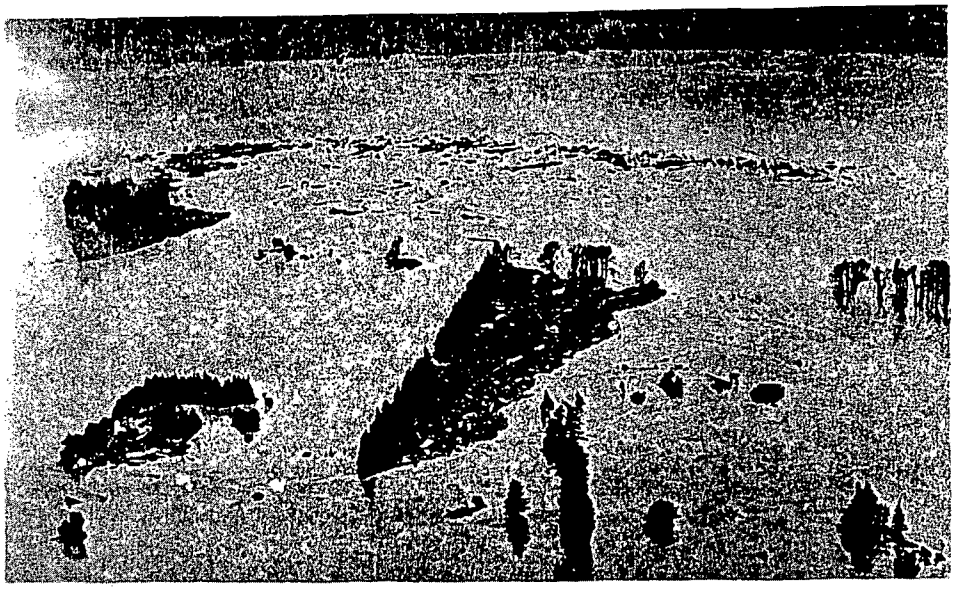
On Monday, the 21st of December, a great mass of tropical air, supersaturated with water, was driven in from the Pacific over these northern ranges. The watersodden air, cooled rapidly as it was deflected upward by the mountains, dropped its load like liquid squeezed from a sponge. On the 21st and 22nd of December torrential rainfall approaching cloudburst proportions was common over most of the north coastal counties.

On the 22nd Garberville, on the South Fork of the Eel, recorded 8.29 inches. In the 1955 flood period its highest one-day fall was 3.23 inches. Grizzly Creek State Park on the Van Duzen River recorded 6.52 inches on the 22nd, against a record 4.43 inches in 1955. Klamath Glen recorded 4.02 on the 22nd and 4.01 on the 23rd. The report from this station noted that "the gauge is near the river mouth and does not reflect rainfall in the upper regions" (where it was much higher). Likewise, Jedediah Smith State Park, near the mouth of the Smith River, reported 4.08 inches, compared to a 1955 higher figure of 2.74.

Highest one-day fall on record in the area was at Richardson Grove, well up on the South Fork of the Eel, with 11.30 inches on the 22nd, and 7.23 on the 23rd. Still farther up the Eel drainage, Laytonville recorded 10.75 inches on the 21st, and 11.75 on the 22nd. The heavy December 21st rains here had already started downstream when the widespread downpours of the 22nd struck.

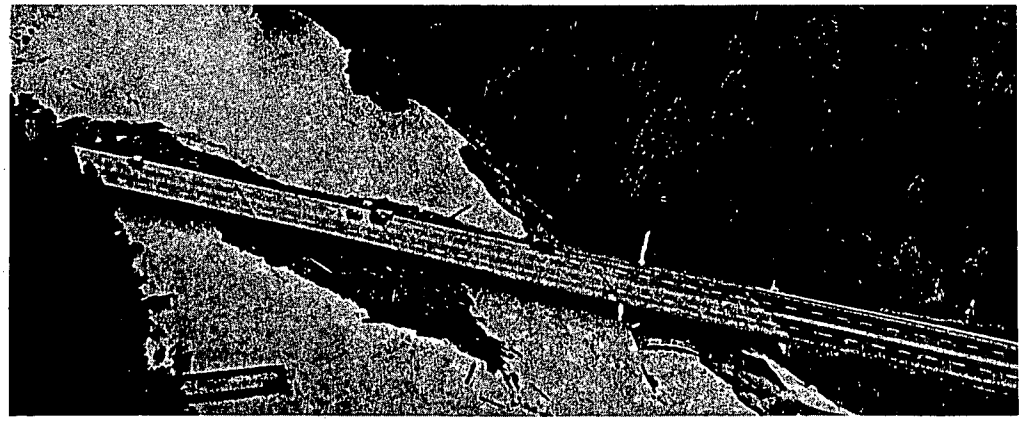
The water falling on the saturated ridges ran off almost as fast as it fell, and the resultant rise in the river canyons was frightening. On the 22nd all the major river systems of the north California coast were flooding heavily and still rising—primarily the Eel, but also the Van Duzen, the Mad, Redwood Creek, the Klamath-Trinity system, and the Smith.

In places, the rise was several feet an hour but actual recordings of water depths are spotty. Before the rivers crested many gauges were swept away or topped by the raging floods.

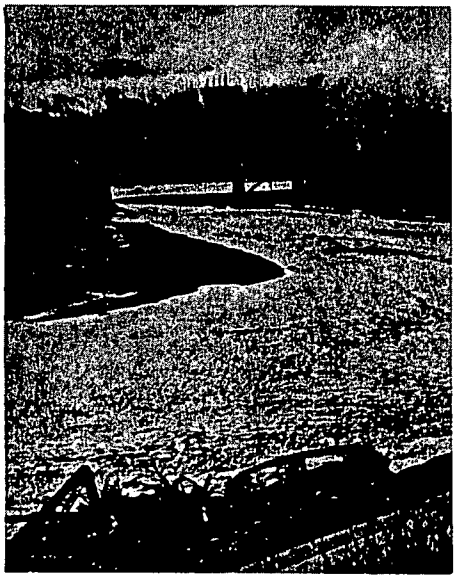


Eel River in full flood, site of town of Pepperwood in foreground. Highway 101 passes across photo about quarter of the way up. Town was destroyed, with many buildings caught in groves of trees amidst debris seen in picture. (Photo courtesy of Eureka Newspapers, Inc.)

ABOVE: Debris deposited by flood on US 101 in redwood groves just upstream from Pepperwood. Barn with cupolas came from site across river and several miles upstream. BELOW: Downstream bridge of pair on Redwood Highway at South Scotia was also flood victim. Older bridge at left of through-truss design, survived flood because it was high enough to avoid debris which collected on truss below deck of newer bridge now missing at right. (Photo courtesy of Eureka Newspapers, Inc.)



George Leatherwood Memorial Bridge, on US 101 Freeway near Dyerville on South Fork of Eel, withstood flood after blasting of debris by a highway maintenance man. Stubs visible just downstream are approaches to old through-truss bridge on Route 254, Avenue of the Giants. This bridge failed at height of flood, when water was somewhat higher, although it had stood through many previous floods. (Photo courtesy of Eureka Newspapers, Inc.)



ABOVE: Destroyed Northwestern Pacific Railroad Bridge at South Fork. One of the wrecked spans may be seen in foreground. BELOW: View of railroad right-of-way in main Eel canyon at Alderpoint, where river rose about 95 feet. Note earth deposited on tracks. (Photo courtesy of Northwestern Pacific Railroad.)

An observer at Alderpoint, on the main Eel River above its confluence with the South Fork, estimated a record crest between 95 and 105 feet. This was at least 15 feet above the Eel's highest crest here in 1955.

With the streams already running bank full, such a rise was inevitable. In the 36 hours of heaviest rainfall on the 21st and 22nd, the Eel drainage received additional precipitation about equal to dumping into it the 3½ million acre-feet of Shasta Reservoir when filled to capacity. As these torrents of water roared down the river, the people of Humboldt County began to realize they were experiencing the most disastrous flood on record—a "thousand-year flood," as one engineer called it.

Virtually every structure on the flats along the lower Eel Canyon was swept away, and in many cases residents escaped with little more than their lives and the clothes they wore. On some 20 miles of the lower South Fork, town after town was devastated. Upstream on the main Eel those towns that were located near the flood level also suffered heavily.

Below the junction of the two streams, the towns of Holmes, Shively and Alton were virtually wiped out. Pepperwood, a small town of about 400 people on US Highway 101, had only two or three ruined buildings left standing when the waters receded, and the townsite is now a debris-cluttered plain with the houses piled in a helter-skelter heap against a grove of trees downstream.

Although the rise at many points was 15 to 20 feet above the highest flood of record on the Eel, the loss of life was low, presumably because modern communications warned most people in time. Nevertheless, few saved any personal property, as none believed the crest would be so much higher than in 1955.

Actually, the amount of water flow was incredible for such relatively small river systems. Below Alton, the Eel is joined by the Van Duzen River, which crested simultaneously. At the height of the flood, stream velocity at this point is estimated to have approached one million cubic feet of water per second. This flow would fill Shasta Reservoir in two days, so the analogy used above, comparing the rainfall with dumping Shasta Reservoir into the river is not farfetched.

If a flow of around 900,000 cfs is accepted, this can be compared to the 1,100,000-cfs flow of the Columbia during the same floods in the northwest. The average flow of the Mississippi at Vicksburg, near its mouth, is less than 600,000 cfs, and even in its great floods is only about 3,000,000 cfs, so it can be said the Eel in flood was carrying almost a third of the amount of water the Mississippi does in its worst floods!

In this comparison, it should be noted the Mississippi has a vast area over which to spread, with a very gentle gradient. The flow in the Eel, traveling in a narrow canyon with a steeper gradient, was much faster, and hence more destructive. Houses were not gently lifted off their foundations

and floated away, they were tossed along almost as before a fire hose.

A complicating problem of this flood and its extraordinary rainfall was the tremendous amount of "drift." On the slopes above the rivers, broken tree branches, ancient windfalls, and partly uprooted stumps were loosened and carried down into the streams. This material, some of which had lain undisturbed for decades, moved into the center of the stream where it was carried along at 15 to 20 miles an hour.

Many lumber mills in the canyons had "cold decks," that is, their winter supply of logs, stacked close to the river bank, but at levels where they were believed safe from flooding. As the water rose, these logs, weighing up to 30 tons each, were picked up and carried out into the stream to become deadly missiles shooting along in the other debris.

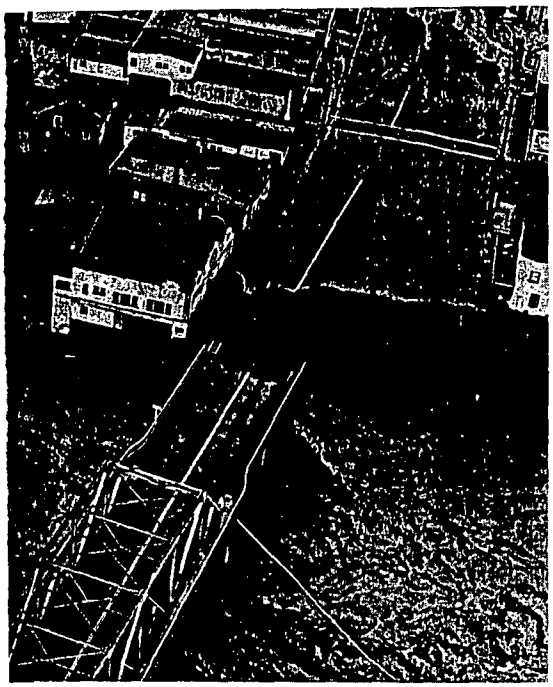
At Pacific Lumber Company in Scotia, where a tract for the cold deck had been especially raised by filling to above the 1955 flood level, several thousand logs totaling 18,000,000 board feet were swept away. In addition, some 15,000,000 board feet of stored lumber went downstream, and railroad boxcars on a siding were tossed around like dice thrown from a cup. The flood losses of this company alone were about $8,000,000.

North of Eureka, in southern Del Norte County, the Klamath, always a strong, deep stream, rose rapidly and swept away the entire business section and many private homes in the town of Klamath and nearby communities. The beautiful old concrete arch bridge here, famous for its statues of California Bears on either end, was a casualty.

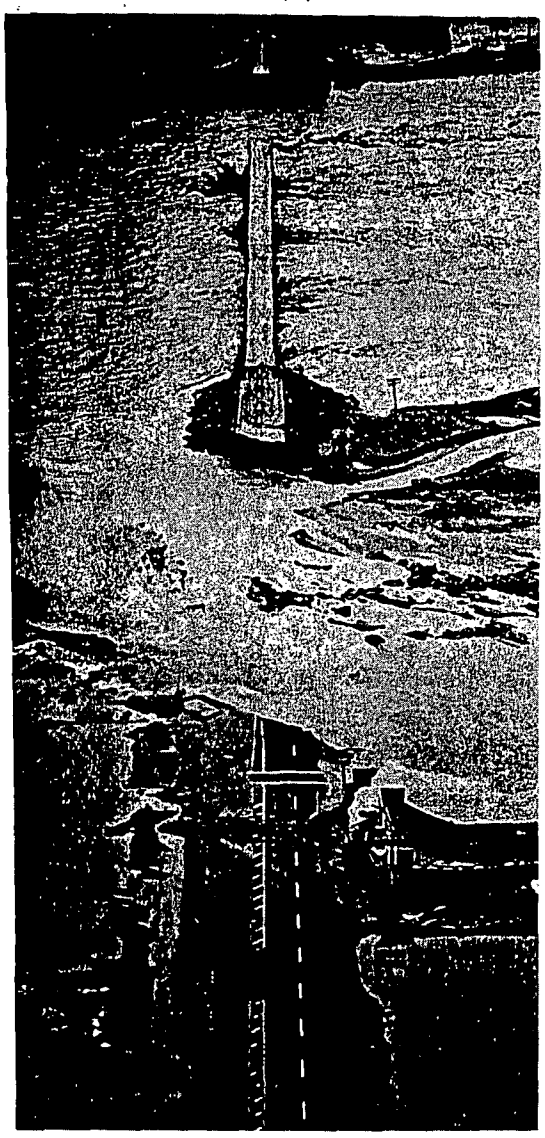
An eyewitness of the bridge's death told Sam Helwer, district engineer, that before the structure failed, debris was backed upstream several hundred feet, although the river level was still several feet from the top of the arches. At times small logs would come hurtling downstream, hit the floating debris, and shoot into the air completely over the structure. The pressure of the river against the debris finally pushed 400 feet of the bridge out of the way, and the debris shot downstream with a roar.

Altogether, District 1 lost 18 state highway bridges, 7 of these on the Redwood Highway, but the full extent of the loss was not clear until some days after the flood because of the disrupted communications. In many cases the bridges carried the utility lines, and when the bridges

ABOVE: Squaw Creek, cascading down the steep slopes at Cummings on the Redwood Highway, tore this gap in the road. BELOW: This concrete arch bridge on US 199 above Crescent City withstood the flood, despite obvious pounding. Note debris lodged in every opening, and battered conditions of railing.



ABOVE: North abutment of North Scotia Bridge at Rio Dell torn out by force of Eel, here shown partly in flood. Building at left of broken bridge end is now gone. (Photo courtesy of Eureka Newspapers, Inc.) BELOW: Looking south along US 101, the Redwood Highway, with the town of Klamath in the foreground, and washed-out bridge in background. (Photo courtesy of Eureka Newspapers, Inc.)



went out, electrical and telephone lines also were broken. In some places, the rushing water literally washed utility poles out of the ground.

Mostly by radio, the information trickled into district headquarters. The first reports came in on US 101, as much of the damage here was close to the settlements. Here, too, was the most serious bridge damage.

South of Fortuna, where the Eel begins to emerge from its canyon, the river makes a big reversed S, which the highway crosses like the bar in a $ sign, and each crossing of the river needs a big bridge.

At the first crossing just south of Fortuna, more than 600 feet was gone from the 1,613-foot Robinson Ferry Bridge. One large through-truss span, and 5 ¾ concrete approach spans were missing. This effectively stopped all traffic on US 101 south of Eureka.

Just beyond this bridge, within the curve of the bottom half of the Eel's reverse S, lies the flourishing town of Rio Dell, with US 101 its main street. Here at the south end of town, another bridge crosses the Eel, the North Scotia Bridge, giving access to Pacific Lumber Company's town of Scotia, and accommodates traffic heading south on the Redwood Highway.

At the Rio Dell end of this bridge, also a large through-truss structure, the river washed out 62½ feet, including the abutment. The river bed is narrow and deep here, and readings at Scotia indicate the flood may have reached its greatest velocity in this canyon.

After the wide swing around Scotia, this tremendous flow was concentrated against the Rio Dell side, and it cut deeply into the steep bluffs. Several houses and stores tumbled into the river, and the current tore out the bridge's northern anchorage, leaving an open gap.

Rio Dell was isolated. The only other entry is via a county route, the Blue Slide Road, which connects the town with Ferndale along the south side of the Eel. Several miles of this road which lay close to the river were gone completely, including the several feet of fill used for base, and the river was running over it many feet deep.

Across the Eel to the south lies Scotia, with Pacific Lumber Company bereft of all its stored logs, and a big portion of its inventory of lumber. Although there was some flooding of the road here, damage was negligible. A few miles farther on, at the top of the reverse S, a pair of bridges crossed the river, carrying northbound and southbound traffic on separate structures. The older structure, a through-truss type which stands upstream and carried the northbound lanes, survived the flood.

A new bridge, opened to traffic in the winter of 1960–61 and which carried the southbound lanes, was swept away. Although it stood higher than its companion, it was a deck truss type, its truss extending down below the deck 18 feet. Drift collecting in the steel truss finally created such a dam the bridge was pushed off its piers.

Beyond these bridges the road follows the south bank of the river for a few miles, including the portion through Pepperwood. On the sections close to the river, undercutting and slides were severe up to the point where the road veers away from the main canyon and starts up the South Fork.

At the southern end of the Avenue of the Giants—the old Redwood Highway which has been retained for tourists—the road crosses the South Fork. Here for many years stood an old fashioned through-truss steel bridge, and when the freeway was built it was retained as a connection from the main road into the Avenue.

This fine old relic is gone, an early casualty to the flood. It stood much lower than the new freeway bridge, and no doubt its trusses collected great masses of debris before it gave way, for in this section of the canyon the water boiled through 20 feet deeper than ever before recorded.

Its younger companion upstream, a simple steel girder type, offered less resistance to the combination of debris and water, but nevertheless almost became a casualty also. At the height of the flood, when debris was piled against the structure in great depth, and the deck portion was actually visibly lifting and shifting on its supports,

Division of Highways maintenance man William F. Wilson, Jr., climbed out on the debris and at the risk of his life planted charges which broke up the jam and saved the bridge.

The freeway sections between Dyerville and Phillipsville, totaling 23.4 miles, withstood the flood well. In one place underground water filtered out some of the subgrade, allowing two lanes of the paving to drop several feet. At another place a culvert was plugged by debris and the resultant stream over the paving undercut the two outside lanes so that they dropped away. Near Dyerville and at one or two other points the river washed out the outer edge of the fill so that a total of several hundred yards of guardrail was lost.

At no time was the freeway closed to traffic, and such repairs as were necessary represented commitment of a small group of men and equipment for only a few days at the most. With such minor damage, despite the fact the river came over the paving many feet deep in places, the superiority of modern engineering and construction was demonstrated. Cut slopes showed little or no tendency to move, fills remained stable, there was no bridge damage, and, in general, drainage functioned perfectly.

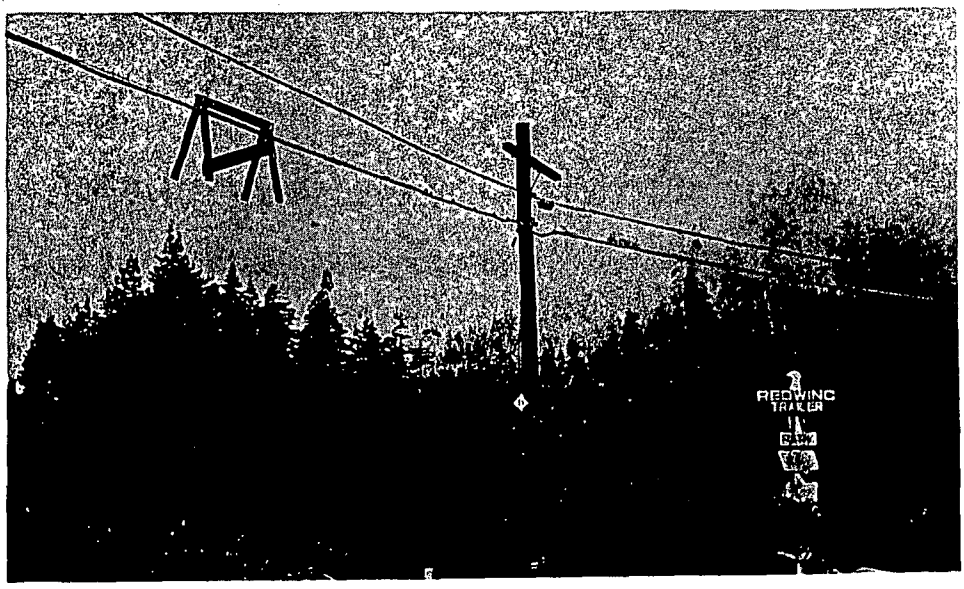
On the old, obsolete sections between Phillipsville and Laytonville destruction was so severe it will take at least a year to complete repairs. Slides involving half a million yards of earth were not uncommon, and washouts cut great ravines across the highway. On the precipitous portions between Garberville and Leggett, where the road clings to a narrow ledge hundreds of feet above the river, undercutting eliminated at least half of the highway in many places, leaving a one-lane road with no outside shoulder, and two- and three-hundred-foot drops alongside.

Where the damage in the lower Eel mostly resulted from tremendous flows and heavy debris in the main stream, much of the damage in the upper canyon was caused by side water. The canyon walls are very steep here, and vegetation is sparse.

The amount of debris loosened by the pelting rains and washed down the

Logs from mills' storage and other debris carried down by rivers and washed into Crescent City harbor. Cut logs are worth about $100 apiece.

ABOVE: US 199 in the Smith River Canyon, the section of the Redwood Highway which connects Crescent City and Grants Pass, Oregon, is here seen completely washed away without vestige. (Photo courtesy of Six Rivers National Forest, U.S. Forest Service.) *BELOW: This photo at Weott gives an inkling of how high water was.* (Photo courtesy of Eureka Newspapers, Inc.)



Road destruction may be from several causes. This photo on US 101 in Mendocino County shows the effect of undercutting by a parallel stream.

ABOVE: In this photo of roadbed destruction on Northwestern Pacific Railroad debris washed down the slope has filled the culvert and the stream has cut a new bed. (Photo courtesy of Northwestern Pacific Railroad.) *BELOW: Destruction here is by slipout, or, in other words, a slide of the supporting slope below the roadbed.*

slopes was very heavy, and culverts and small bridges choked quickly. Tiny streams and normally dry gullies became raging torrents which the established drainage facilities could not accommodate, particularly since they rapidly clogged with debris. Water rushing across the roadway washed out fills and foundations, often "eating back" across the paving until there was sometimes a cut a hundred feet deep where the road had been.

In places the river cut away the toes of slopes hundreds of feet high, and the entire slope slumped, bringing long stretches of highway with it. In other places slopes above the road, sometimes rock, sometimes gravel, slid down to cover hundreds of feet of highway. Except for those located on the freeway, every town along the upper Eel was isolated from its neighbors. The freeway was isolated from Eureka by the damaged bridges.

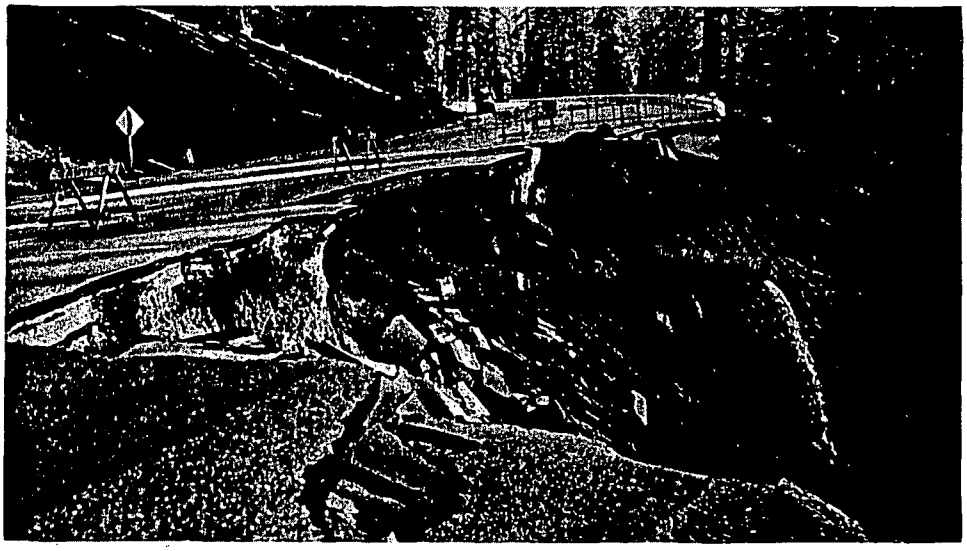
North of Eureka most of the Redwood Highway is on high ground, or is modern expressway or freeway. Except for the destruction of the Klamath River Bridge, damage between Eureka and Crescent City was slight. Heavy flooding by Redwood Creek in Orick left a layer of silt several feet thick on the roadway, but this was quickly cleaned up.

But it was another story on US 199, which carried the Redwood Highway into Grants Pass, Oregon, via the Smith River Canyon. Above Gasquet, damage was severe. Three concrete arch bridges were carried away, and several miles of roadway lost. In places the roadway destruction here was so complete the canyon looked as though it had never had a road through it.

So extreme was the damage in this canyon, it was days before it could be assessed adequately. Crews were sent up through Oregon to begin working on the northern end of the damaged area, and others started working from the south. The only way the damage could be surveyed properly over the 20 miles or so of worst devastation was by sending young engineers in on foot to hike through with backpacks. In this canyon, and in many other places in Highway Districts 1 and 2, where road communications were completely destroyed, this meant miles of travel on foot through knee-deep mud, steep climbs high above the river through trackless forest to get around washouts, and sleeping and eating wherever local hospitality was available.

When the floods receded, the Redwood Highway was closed to all traffic in dozens of places. Damage to east-west routes connecting Humboldt County with the Sacramento Valley was equally severe. All highways in and out of the area were closed.

BELOW: This photo shows one of the few places where damage occurred on the Redwood Parks Freeway, resulting in the loss of two lanes. Culvert became plugged and stream went over pavement, "eating back" by washing out slope on outside.



Crescent City had a roundabout route open north over 101 through Oregon. Eureka and the Humboldt lowland were isolated, except by sea through a debris-cluttered harbor, and by air through small and often weather-closed airports, for the railroad was also hard hit.

The Northwestern Pacific had suspended service indefinitely. Its tracks down the Eel Canyon were devastated. When the flood subsided, railroad men found on a 100-mile stretch more than 50 miles of track twisted and uprooted, millions of yards of rock riprap washed away with fills gone, three steel bridges destroyed, over 70 pieces of rolling stock missing, and debris and silt piled everywhere the right-of-way was not destroyed. Cost of repairs was estimated at $10 million.

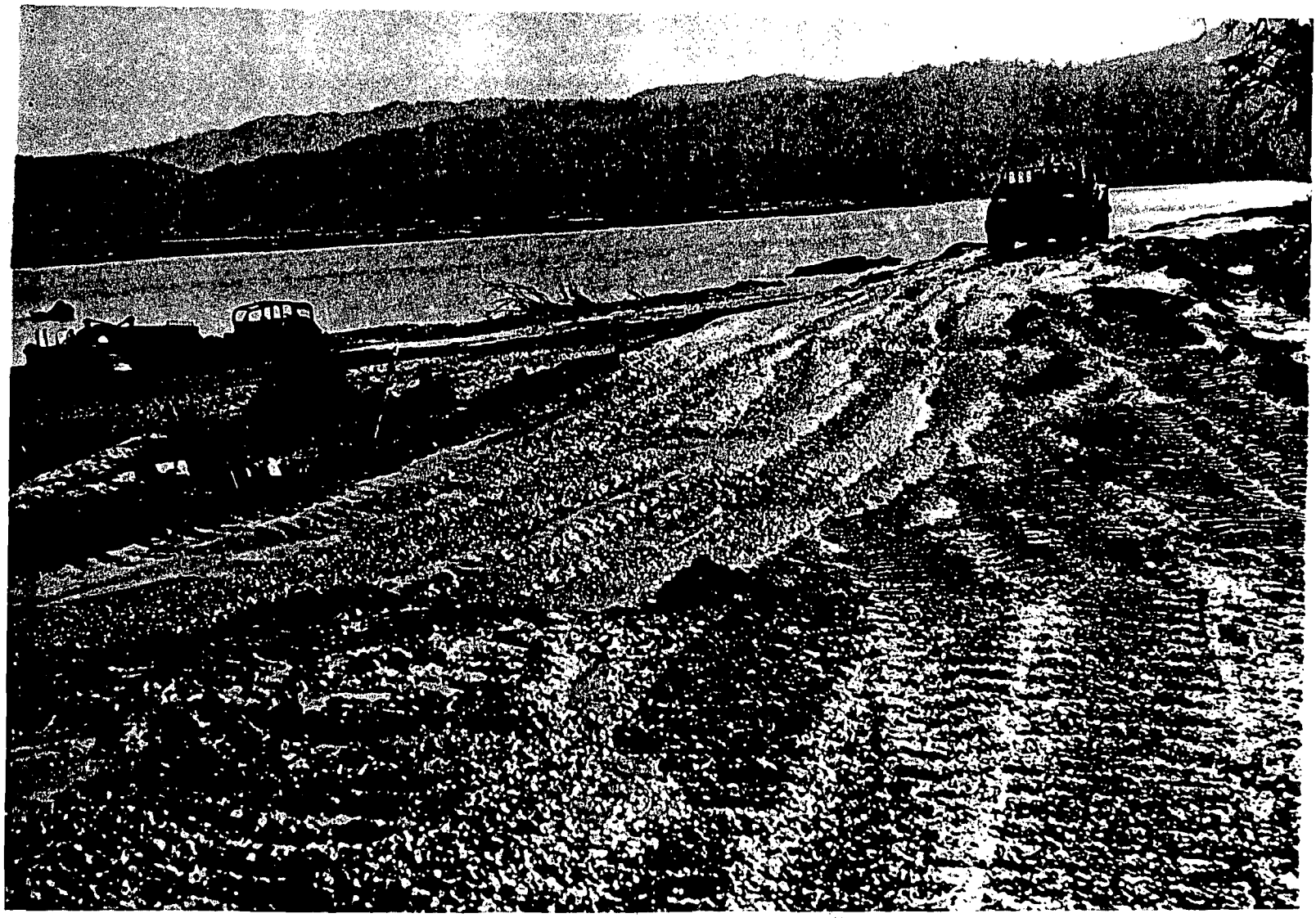
Since the Humboldt–Del Norte economy is about 75 percent based on forest products, and since normally the railroad hauls about 75 percent of these products, this made the flood a doubly severe blow at the region. Not only had the floods caused tremendous damage to property, but the region's ability to recover was crippled.

The value of modern transport was once again demonstrated, for with the destruction of its transportation, the area's economy was brought to an immediate halt, and many thousands of people were affected in addition to those whose property was in the direct path of the flood. This put tremendous pressure on state highway personnel to reopen the roads as soon as possible, to alleviate in part the economic distress.

Although it is being said the storm was "one in a thousand years," there is no guarantee this is so. Certainly new records are now established which must be taken into account in future design, which means more expensive construction. It should be kept in mind that both the 1955 and 1964 storms struck exactly on the winter solstice, when the northern hemisphere storm track is at its most southern point. The same set of circumstances could repeat next year!

Another kind of damage occurred when underground waters, seeping through fill, washed out part of road foundation.

ABOVE: This paving damage was caused by pressure of sliding material on slope at right, forcing its way between road surface and foundation. BELOW: Man in photo has right hand at high-water mark which South Fork of Eel reached here near Phillipsville. This stretch of freeway, recently completed, was constructed five feet above high-water line of 1955 flood.



At right DW-21 loaded with gravel is proceeding to fill point, and at left tractor pushes another unit as it scrapes material from river bar, rebuilding road after Christmas 1964 flood. Scene is along lower Eel River, and some of material being replaced as road base probably previous to flood was road base farther upstream!

The Redwood Highway

Rebuilding After the 1964 Flood

By JOHN ROBINSON, Information Officer

In late December 1964, after the floods subsided, the Redwood Highway north of Laytonville was no longer a highway—it was a string of short pieces of local road, with no connections to the outside world. On the southern portion gigantic slides and washouts at Cummings, Leggett, Piercy and Richardson Grove effectively stopped all traffic, and farther north there were broken bridges at Scotia, Rio Dell and Robinson's Ferry. Almost all of this havoc was the work of the Eel River and its tributaries.

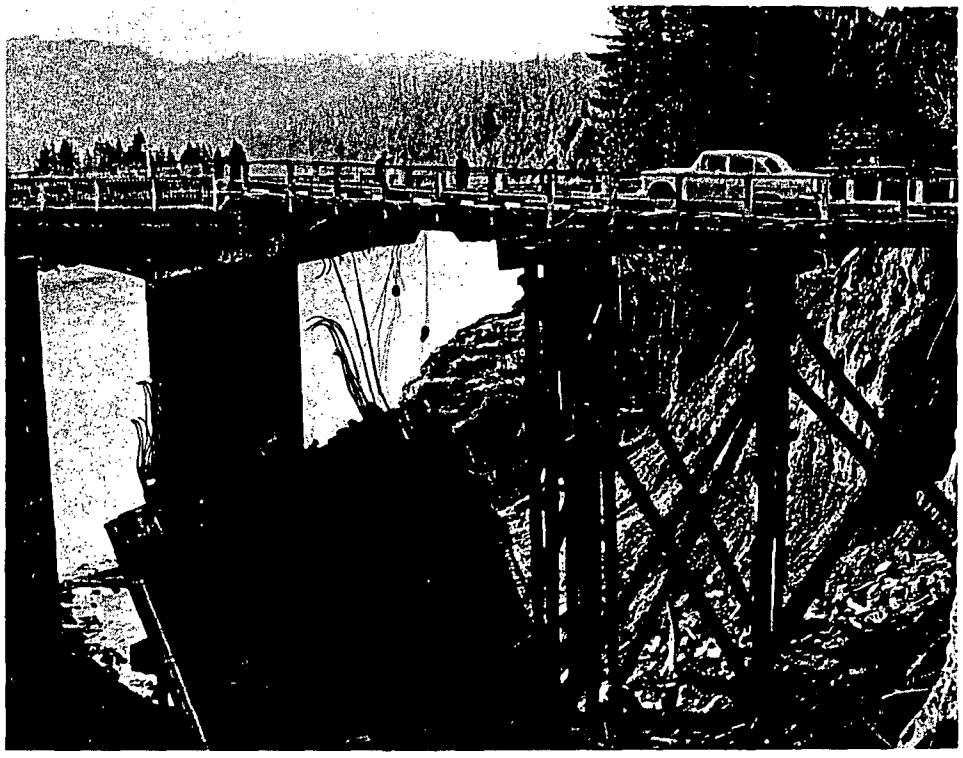
Northward from Eureka there were further breaks at the washed-out Klamath River Bridge on US 101 and in the total destruction of whole sections of US 199, both bridges and roadway, in the Smith River Canyon. Between these major breaks, particularly south of Eureka, there were dozens of smaller places where slides, washouts, slumps, fallen trees, and debris on the road created traffic interruptions or hazards.

It was the job of the highway employees of District 1 in Eureka to repair these places, both major and small, so that motorists once again could follow the long ribbon of the Redwood Highway true and uninterrupted the 250-odd miles from Laytonville to the Oregon state line. Equally important was the need for moving to the San Francisco Bay area

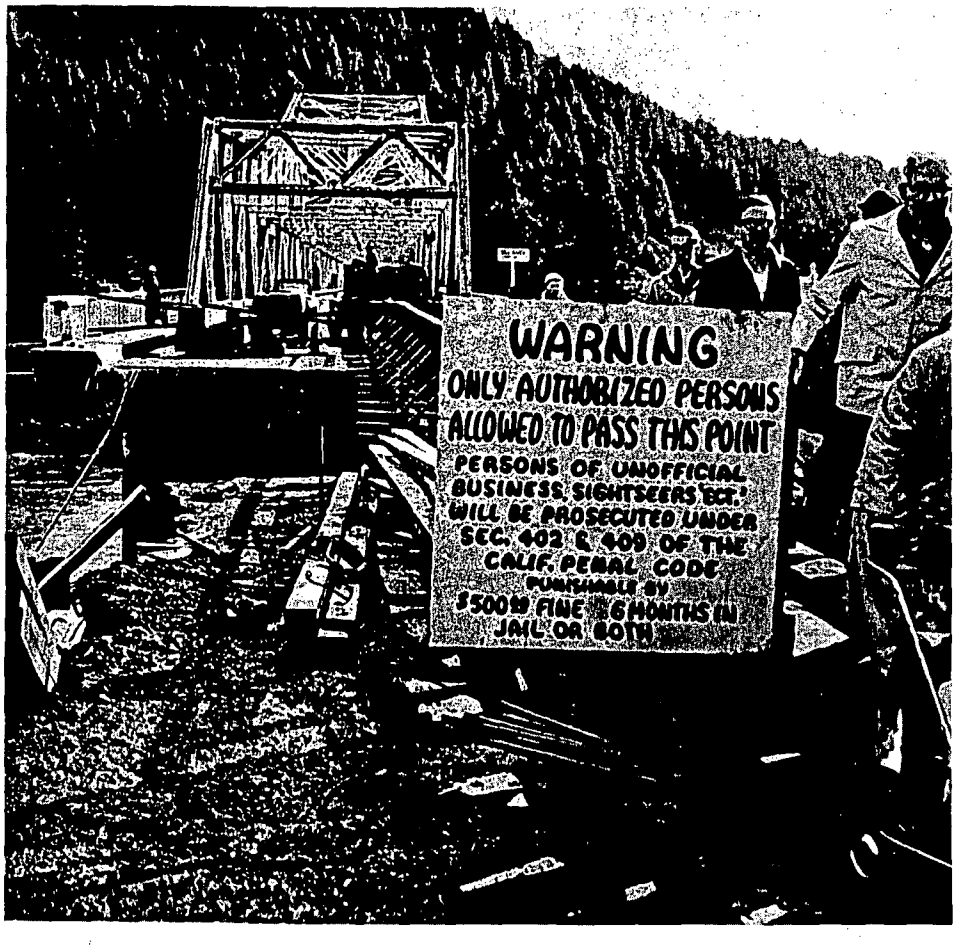
population centers the products of the northwest lumber industry. It promised to be a herculean task, particularly since the major effort first had to include the concurrent reopening of a "lifeline" route to Redding over US 299, which also, along its western sections, had suffered comparably along the Trinity River and in Willow Creek Canyon.

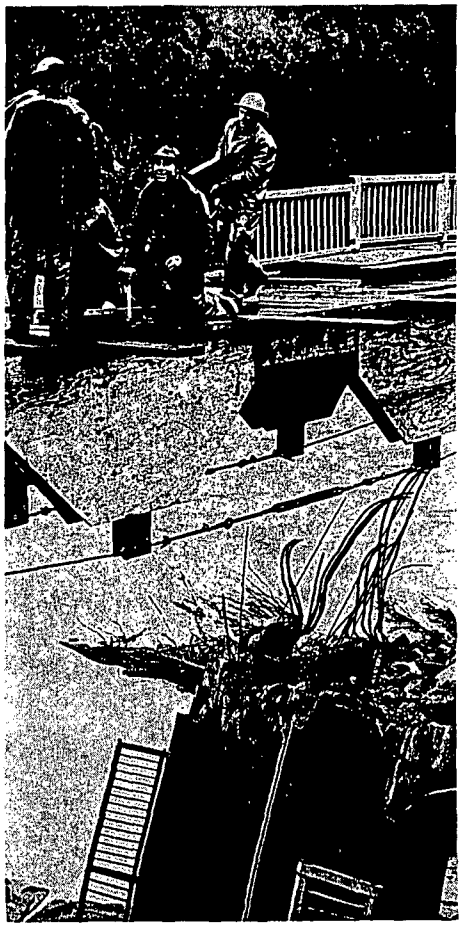
Although destruction was widespread on state and county roads and the area's only railroad, there were several assets. One was the pool of trained construction workers and equipment which existed because the northwestern industry was predominantly logging and lumber products. Lumber companies build their own roads, and hire many catskinners, truckdrivers, and other heavy equipment operators.

Another asset was the well-experienced group of personnel in the Eureka headquarters, many of whom had gone through the 1955 flood, and



ABOVE: Temporary one-way bridge of wooden piles, beams, and planks built across break at north end of Scotia-Rio Dell Bridge carried legal loads for several months. BELOW LEFT: Footbridge was first span over gap and served many needs for two weeks. Requirements of sign were strictly enforced by civil defense officials. BELOW RIGHT: The footbridge, a simple suspension design, being built by Pacific Lumber Co. and P.G. & E. employees. (Both lower pictures Eureka Newspapers, Inc.)





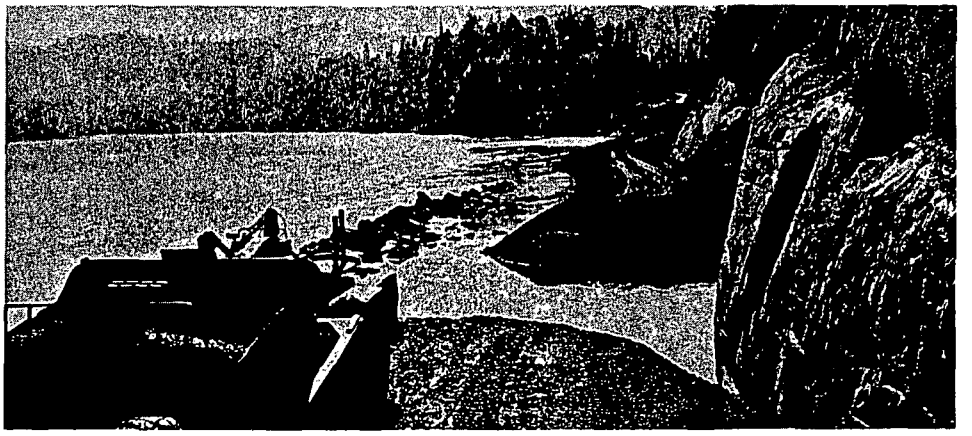
most of whom had learned to take rain and slides as part of their winter lot.

In the realm of luck was the presence of two large contractors with their staff and equipment. Best luck of all was the way the weather cooperated, once it broke in the early part of January.

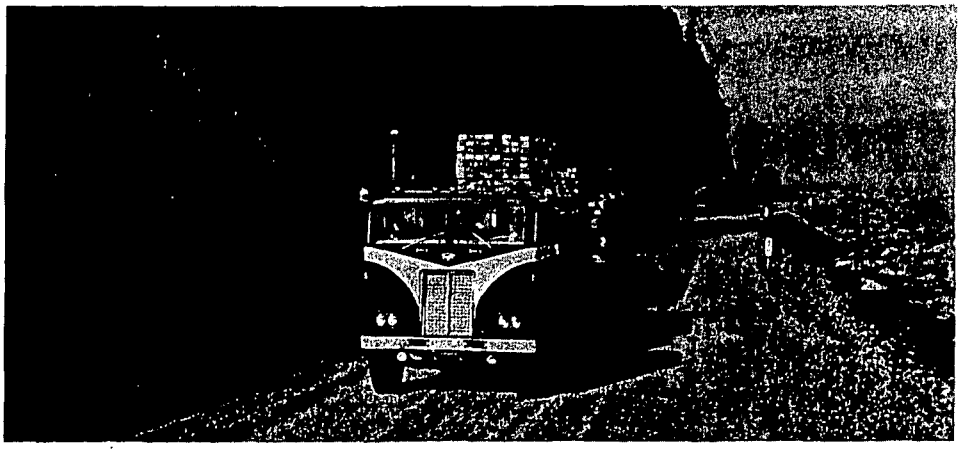
In these first few days of reconstruction, everything was done with a prayer there would be no more heavy rain. The first stream crossings, low-level log bridges, were vulnerable to any rise. Substantial increases in stream velocities could sweep away in a few hours weeks of work building up road base. The weather held abnormally good, and by March much of the work had been consolidated, but was by no means out of danger.

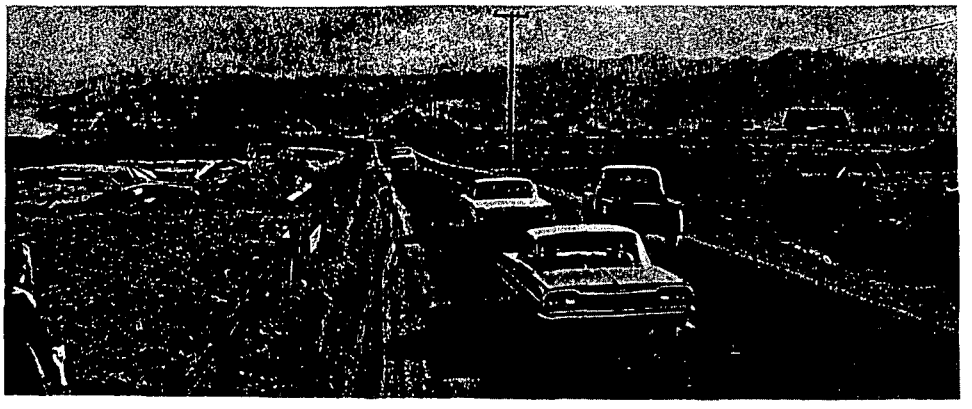
A very valuable asset was the old concrete arch crossing at Fernbridge. Well out on the floodplain, where the force of the Eel is spent, it had stood through more than 50 rainy winters. When the waters went down, it was the only usable crossing giving access to the south.

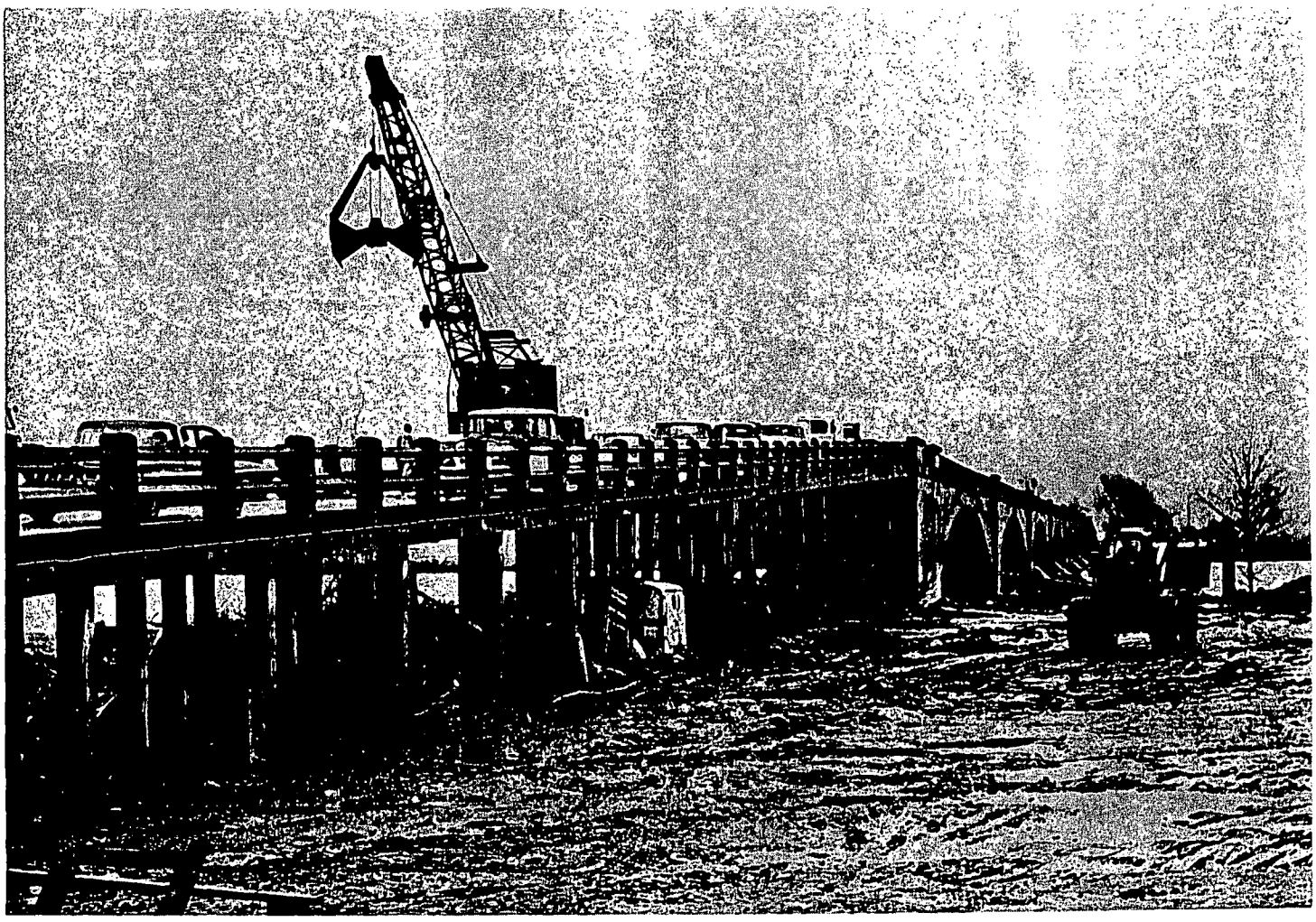
Conceivably, the District 1 engineers reasoned, if a route could be opened from the other shore of Fernbridge over county roads to Rio Dell, and if a temporary repair could be made on the Rio Dell-Scotia Bridge, and if the massive slides and washouts could be repaired, a road of sorts



Five photos this page show steps in development of Blue Slide Road detour on Redwood Highway. Upper left is view of road on January 4 after flood; top is traffic moving in one-way convoys above cliffs before lower section repaired; directly above is filling operation on same section as shown in upper left. Directly below, about three weeks later, lumber trucks moving over this section; and bottom, same detour road where it crosses the floodplain, photographed March 17 after asphalt paving laid.







Equipment clearing debris from famous old concrete span at Fernbridge. Panel delivery under approach ramp was washed there, not parked there. This bridge was only way to get across the Eel to the south from Eureka after flood. View is from north side.

through to the south could be opened. The major piece in this connection would be a county route called the "Blue Side Road" which connected Ferndale to Rio Dell along the south side of the Eel. Unfortunately at one place a stream normally a tiny rivulet had torn a great chasm across this road, and in another place where it ran close to the shoreline, the Eel had completely removed nearly a mile, fill and all.

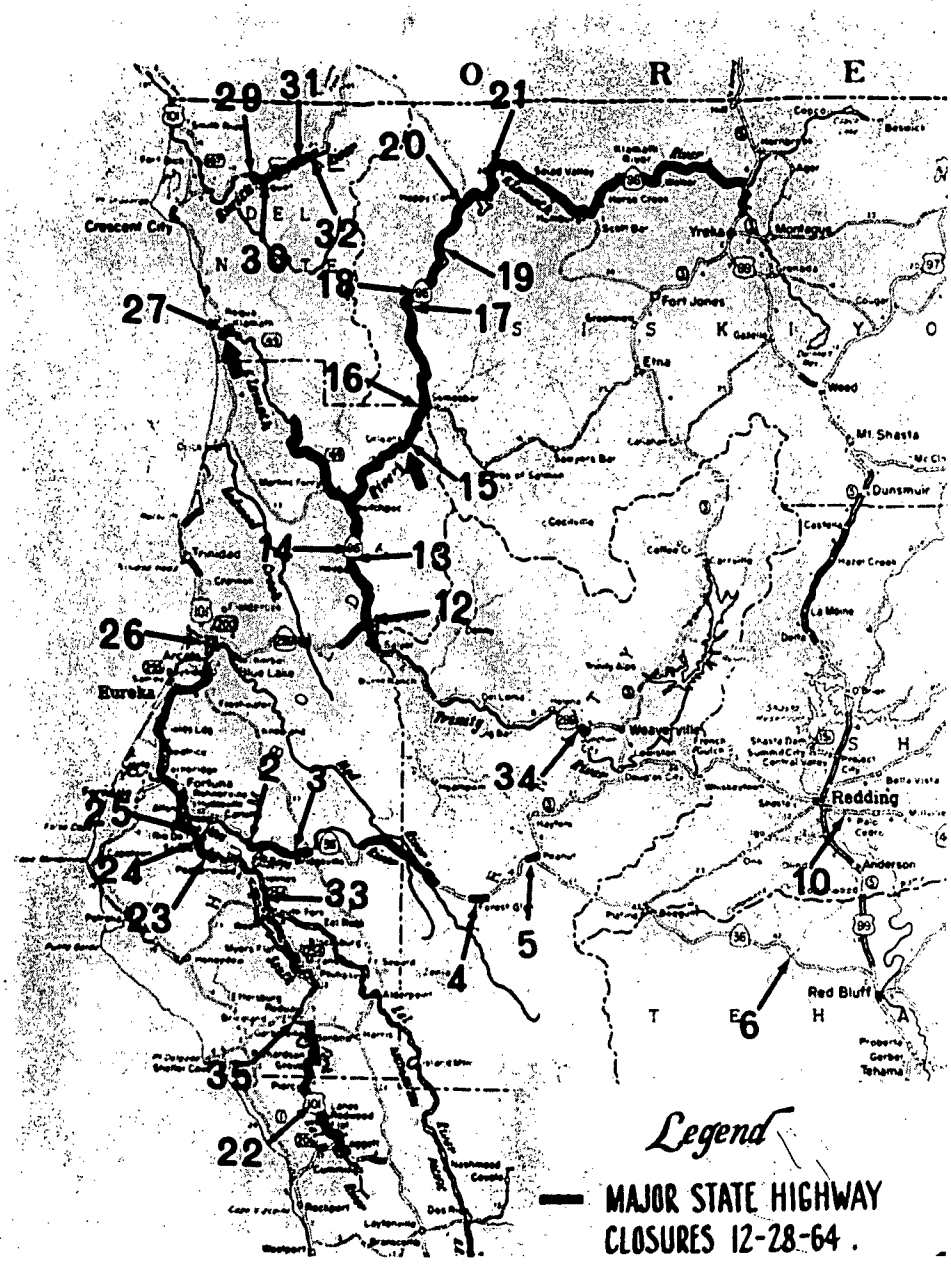
In the first few days of recovery after the disaster, while the engineers were seeking means to once again connect their bits and pieces of shattered highway, movement of people and vital supplies was exclusively by air. In Rio Dell, Scotia, and on Dyerville Bridge the paving was cleared and used for a landing strip for light planes, and something approaching a regular air service was developed. Air Force, Navy, Army and Coast Guard aircraft converged on Eureka. Although operations were marred by two helicopter crashes involving a number of fatalities, there is no doubt the death toll from the floods would have been much greater without the use of modern aircraft.

Shortly after Christmas Pacific Lumber and utility company employees built a small footbridge across the gap in the Rio Dell-Scotia Bridge. Vital materials were hand-carried across this gap, and when roads to the bridge were opened, even gasoline was transferred from one tanker to another with a long hose.

By December 27 the 49th Infantry of the California National Guard had established an emergency route from south of Cummings over the old highway up the Bell Springs grade and along the Mail Ridge route thence down to Garberville. This was the historic route established in the late 1800's and used until superseded by the present Redwood Highway. (See *California Highways and Public Works*, May–June and July–August 1964.)

Much of this route has never been improved. It is narrow, twisting, and climbs to the ridge tops over grades impossible for modern passenger cars under winter conditions. In places it travels along the edge of deep chasms, and large sections are unpaved. After the first few trips the soggy road surface became hub-deep mud. During the heavy snows around New Year's, the drifts were so deep nothing could negotiate the road, and all traffic was forced to stop.

Nevertheless, during the 17 days of operation, the guard brought in 60 tons of vital supplies to the people of



Highway situation map for northwestern California on December 28, 1964. Heavy black lines mark stretches of worst damage. Worst "side water" damage—gulleys, slipouts, slides, and washouts—on Redwood Highway was in vicinity of Nos. 35 and 22 and for several miles to the south of these points. Nos. 23, 24, and 25 were the three bridges damaged in the Scotia-Rio Dell area, No. 26 proved a minor repair problem at a bridge abutment. No. 27 indicates the washed-out Klamath River Bridge, and Nos. 29, 30, 31, and 32 mark the bad washouts and bridge destruction in the Smith River Canyon.

the Garberville area, and brought out dozens of cars of stranded motorists. In places these had to be strung out like mountaineers with tow cables to each passenger car, a military vehicle before and behind it.

On December 30 a contract was let for a temporary, one-lane span across the gap in the Scotia-Rio Dell Bridge and this was completed on January 13. In the meantime, work had been going ahead on the Blue Slide Road.

At first, traffic was forced to use an ancient, slippery, one-lane route which traversed the edge of cliffs above the Eel, while the Blue Slide section along the river was being rebuilt. Working from both ends, with 16 trucks hauling fill on the south end, and several DW-21's hauling riverbed gravel on the north, the crews had replaced the road base and had it carrying traffic in less than two weeks. Since the freeway sections through the redwoods were in relatively good shape, and there were usable bridges at all the Eel crossings south of Scotia, the road was thus open from Eureka to Garberville, but controlled by civil defense checkpoints.

In the meantime, an engineering company of the Fourth Infantry Division had rolled into Crescent City from Fort Lewis, Washington, with 84 men and 41 vehicles. In the trucks were all the parts necessary to build a combat type, pontoon platform ferry. The Office of Emergency Planning had requested their help, in the hope they could do something about the gap at the Klamath River, where the deep channel and swift current precluded any possibility of a temporary bridge. Crossings were then being made by jet boat, which had only sufficient capacity to carry small amounts of supplies and personnel.

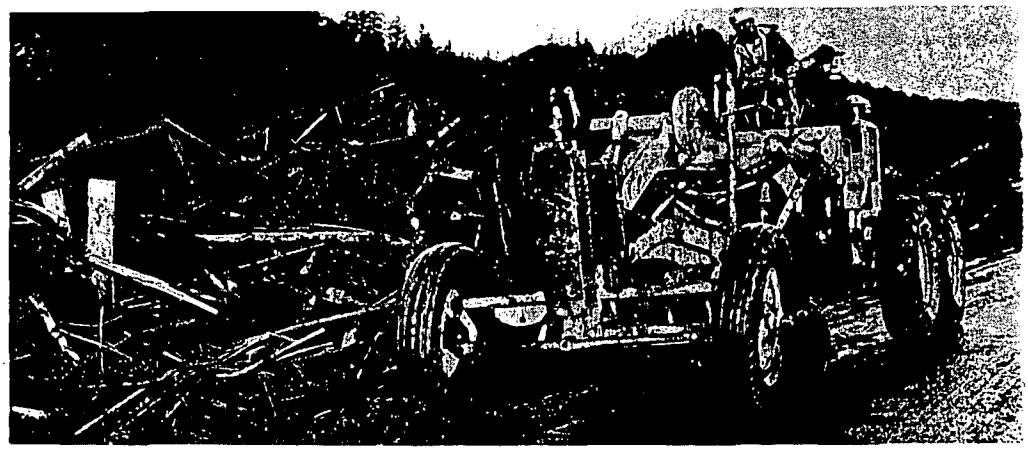
By January 8 the Army Engineers had assembled the ferry on the north bank of the river just below the devastated town of Klamath, and State Division of Highways personnel had pushed gravel landing ramps out into the river. The craft, 93 feet long and rated to carry 65 tons, was simple. A steel framework held the six pontoons together, with a steel deck on the framework. Power came from motorboats which pushed against the downstream side, using the current to help push the ferry across the stream.

Tests were made the same day, and several stranded vehicles were ferried over, much to the delight of their drivers. The next day the ferry started regular service.

At first a log boom upstream was considered to protect the craft from drifting logs, but this proved too hazardous, and a "spotter" was stationed to warn of dangerous drift coming down. A guard boat constantly stood by below the ferry lane in case anyone fell overboard.

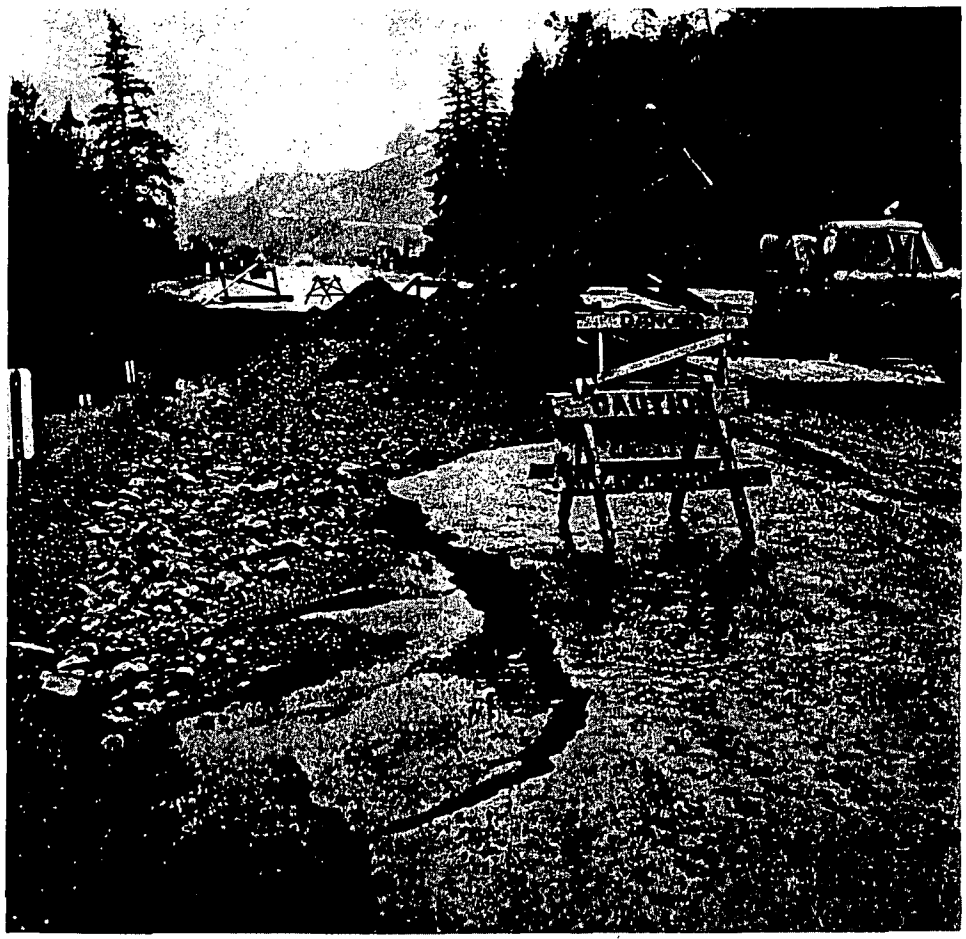
Rated capacity of the craft was 65 tons, but this would be under combat conditions. In view of the situation, 25 tons was set as the safe load. No vehicle was permitted to cross without a proper civil defense pass issued by either the Humboldt or Del Norte County Sheriff.

Fortunately, several contractors already had big rock trucks such as this in the vicinity, and they were invaluable in replacing road base.



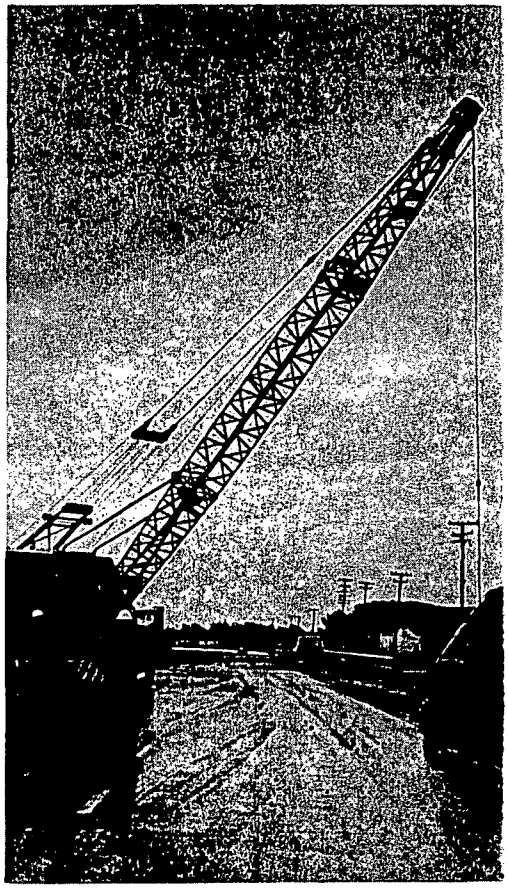
Grader is engaged in cleaning silt and debris off Redwood Highway four-lane section south of Fortuna.

Boom of backhoe is used as crane for lifting sections of culvert into place while repairing washout near Richardson Grove.

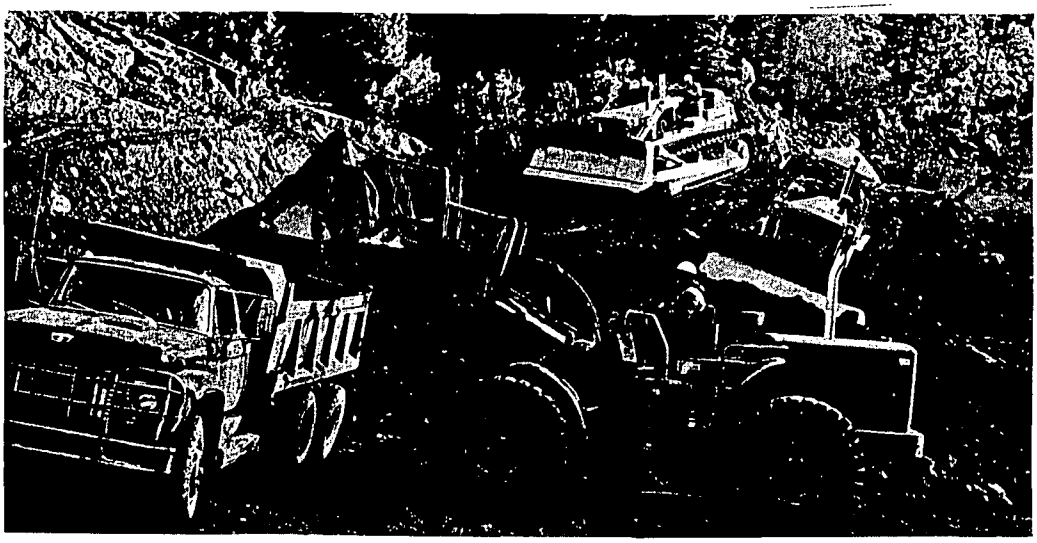


ABOVE: Amount of fill required to repair such slipouts was dependent upon how far down "toe" of slope lay. BELOW: Grader, front-end loader, and dump trucks work together to remove silt in Orick, several feet deep in places, as can be seen beyond highway shoulder.

Tractor tows public utilities repair truck around bad spot at slipout on Redwood Highway. This was on December 27, 1964, during first phase of recovery from flood.

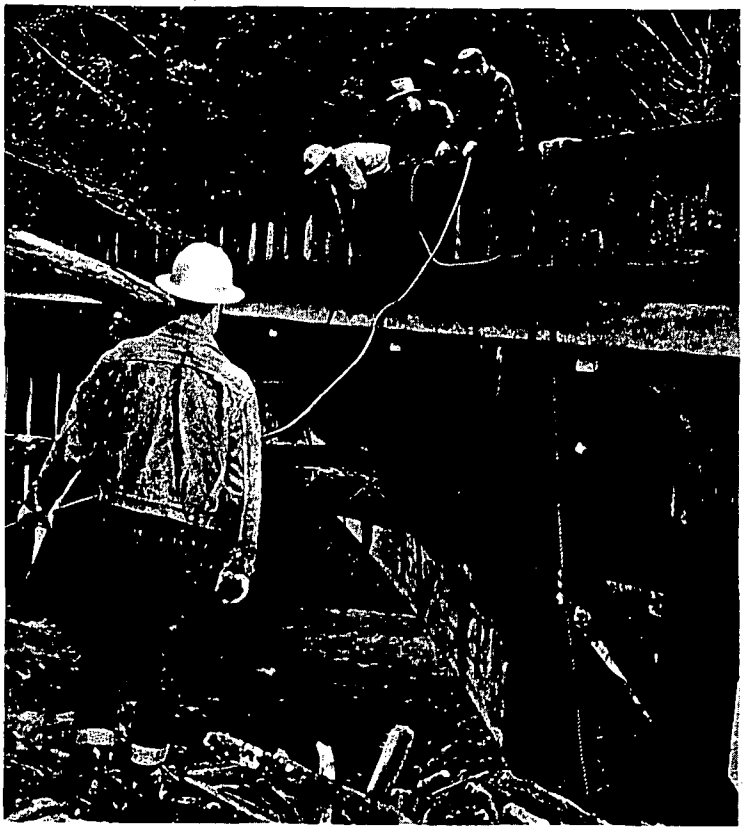


Crane removes logs washed up on undamaged section of county road near Ferndale in order to use it for detour for Redwood Highway.

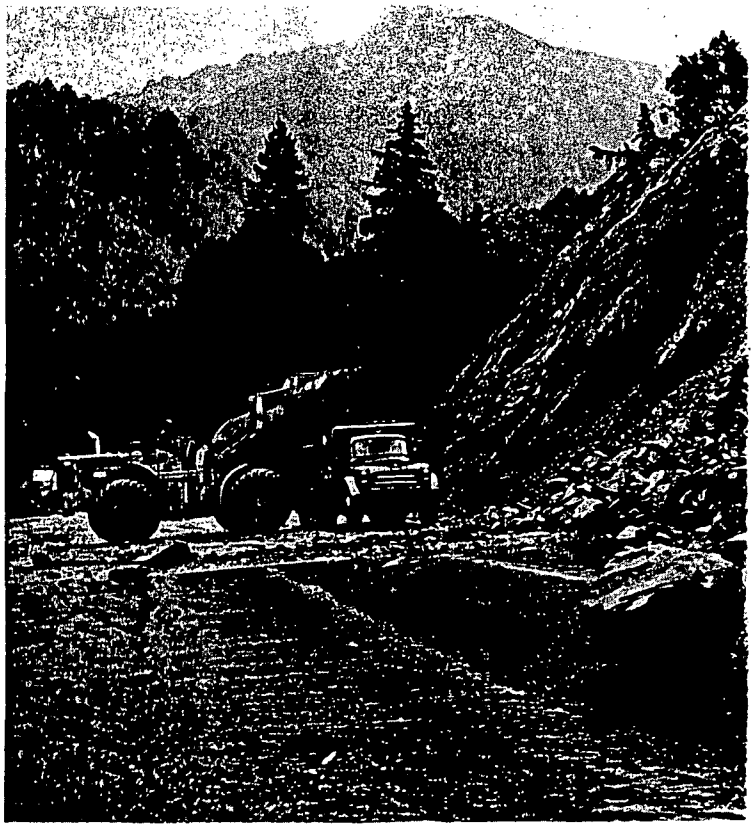


Front-end loader, assisted by tractors equipped with both blades and rippers, keeps stream of material flowing in trucks from "borrow" site selected to provide fill for washed-out sections.

Maintenance crew from Idlewild on US 199 in the Smith River Canyon, clearing debris from bridge which survived the storm.



Minor slide on Redwood Highway south of Cummings being cleared by front-end loader and trucks.



Although hardly more than 100 vehicles were ferried daily during the first weeks, proficiency gradually increased. On February 18 another 30 feet was added to the ferry, and the load limit was raised to the legal highway maximum. By this time the daily lift was more than 500 vehicles.

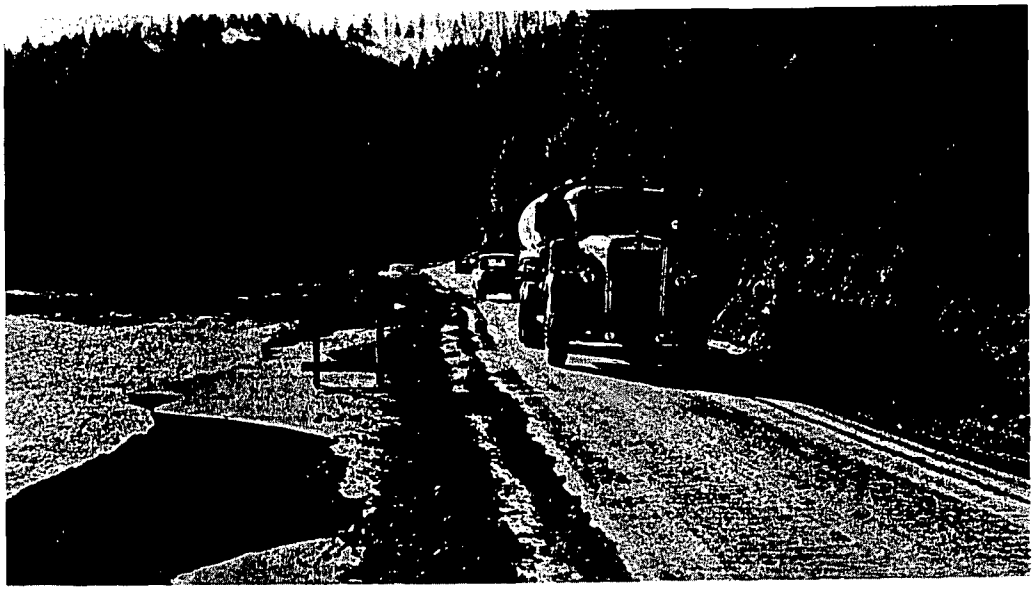
From its first trip the little ferry caught the imagination of the press, and it got wide publicity over the state. This was well deserved, for it faithfully served traffic during daylight hours for more than two months, with only a few interruptions from river level changes.

When the pile structure filling the broken gap on the Klamath Bridge was opened March 14, the ferry was retired after an estimated 5,527 trips across the turbulent stream. During its slightly more than two months of operation, it had carried nearly 30,000 vehicles.

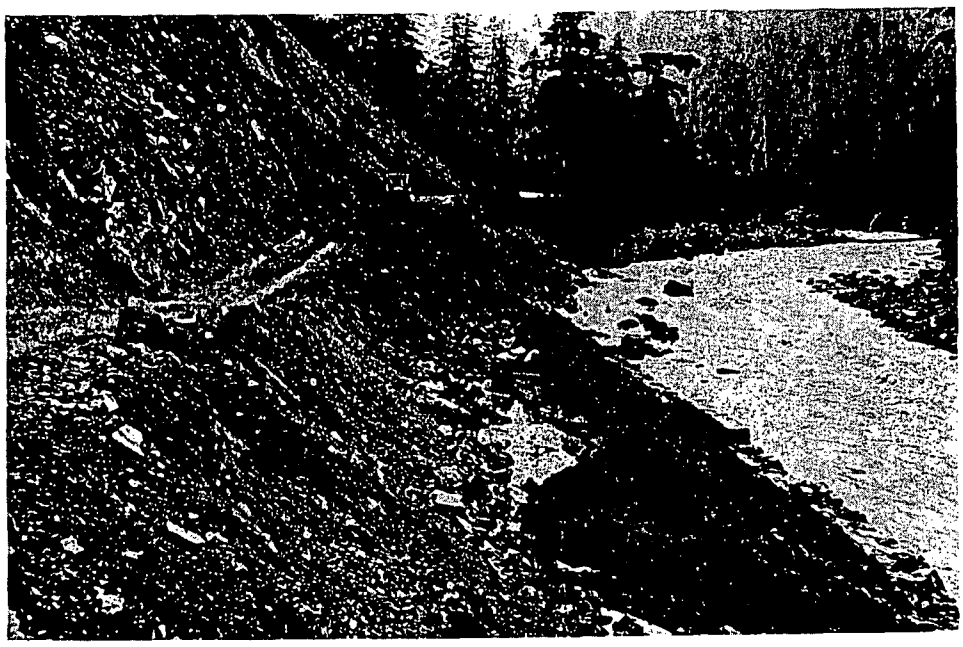
While somewhat less dramatic, the repair of the bridge was also a considerable feat. An emergency contract was let on December 28, but the contractor could do little except size up the job until he had materials, which had to come in from the San Francisco Bay area. On the 9th of January they came in on a barge, and were unloaded and carried by truck the 70 miles from Fields Landing to the south approaches. The barge next went to Crescent City and unloaded the materials for the north end, which needed to be trucked only 21 miles.

Work was started on the 11th of January, and the crossing was opened to traffic on Sunday evening, March 14, after almost exactly two months elapsed time. Since the temporary structure is on piles, with close spacing, it is vulnerable to damage by drift should the river rise. A deflector or buffer of piles was placed upstream for protection.

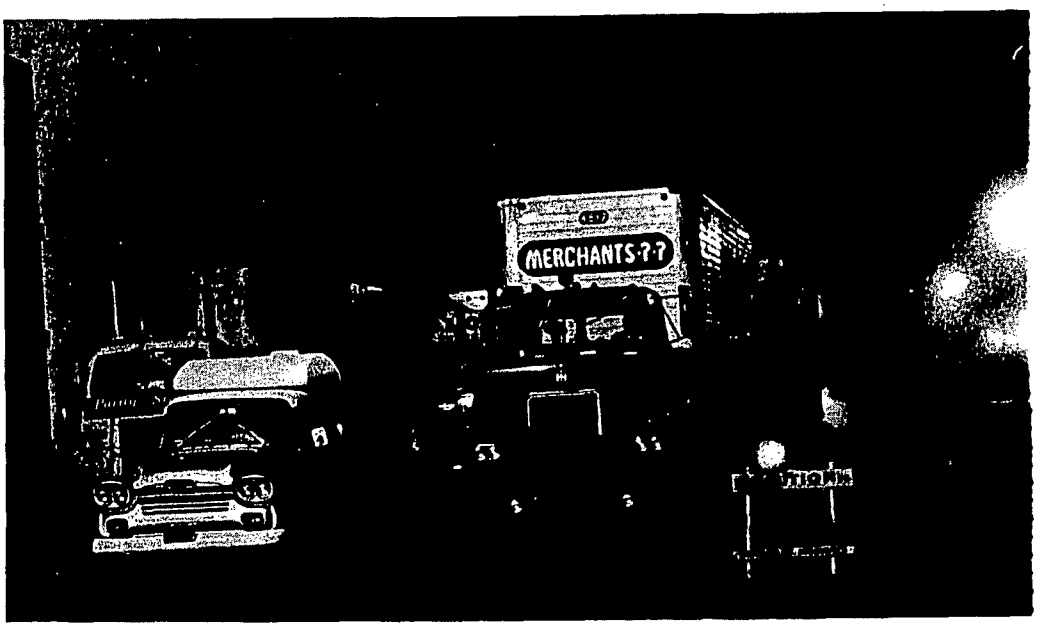
Meanwhile, on the upper reaches of the Eel scores of tractors and hundreds of dirt carriers were working. The sections south of Garberville began to come under control about the time the Rio Dell-Scotia Bridge was opened, and a few days later the first convoy of four-wheel-drive vehicles was brought through from the south. (The first convoy on Route 299 had come through on January 5th.)

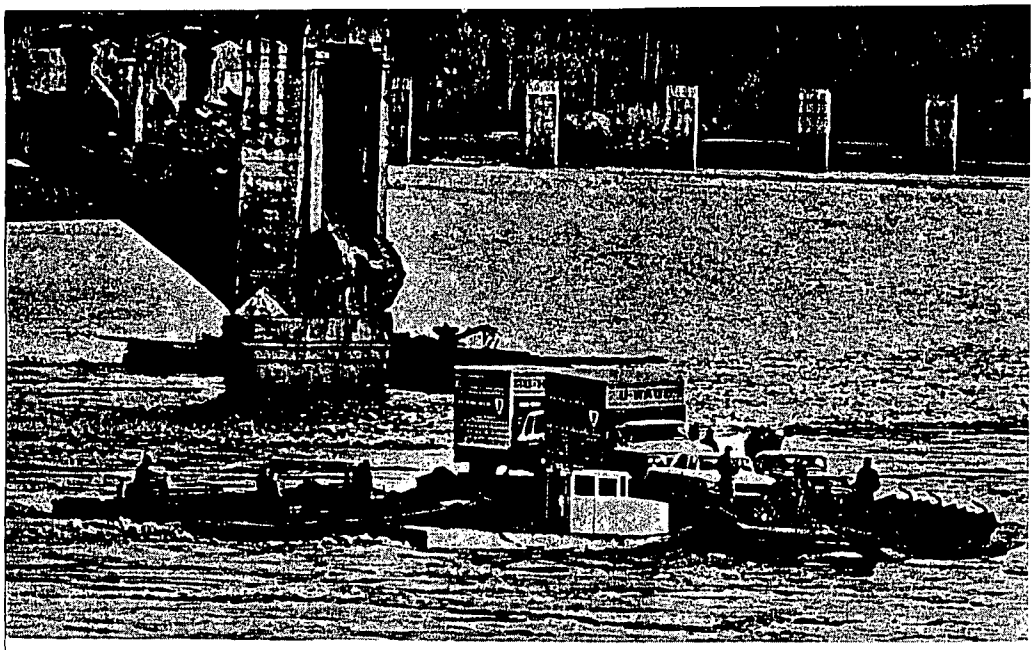


Section of Redwood Highway south of Pepperwood, along main Eel River as it appeared on January 12, 1965. Dirt ridge was used like this wherever paving was destroyed to delineate safe driving area.



ABOVE: Partly rebuilt section of Route 199 in Smith River Canyon. Rock wall was for protection of fill but river rose much too high. BELOW: First truck convoy south from Eureka area on US 101 at Garberville at 2 a.m. on morning of January 16th waiting order to proceed.





Widely publicized Sixth Army pontoon ferry crossing Klamath River; ruined bridge upper left. Note debris on bridge. Piers in background are for new highway bridge under construction. (Eureka Newspapers, Inc., photo.)

Red Cross girl serving schoolchildren at Klamath crossing, January 8, 1965. Army pontoon ferry in background.

Klamath River Bridge with temporary repairs, opened to traffic on March 14, 1965.

When the first convoy of 48 trucks and pickups made it south from Garberville over US 101, it got big newspaper space all over the state. Leaving Garberville January 16th at 2:30 on a chill and foggy Saturday morning, the long line of rigs, preceded by Highway Patrol and Division of Highways vehicles, skirted washouts and slipouts along 200-foot cliffs for two hours in darkness and bad visibility until it arrived safely at Laytonville at the foot of Rattlesnake Grade. The only casualty was one grocery truck which sank in soft going and ripped off one of its fuel lines. Included in the convoy were several lumber trucks and a "reefer" load of Humboldt crab meat. Due to the road condition, none of these rigs were permitted to tow trailers.

Pontoon ferry landing with load of emergency utility repair vehicles borrowed from Oregon early in January. Ferry had been operating only a few days at this time. High water and current were serious problems.

That evening a similar and much larger convoy started north from an assembly point a few miles above Laytonville, and made it through without serious difficulty. Movements could be made only at night, since reconstruction work obliterated sections of the road during daylight hours.

The daily two-way nighttime convoys were continued for some time, with crews each day repairing any damage and continuing to build up and firm the road. In less than a week legal loads were allowed, and continued to move despite heavy rain in two instances.

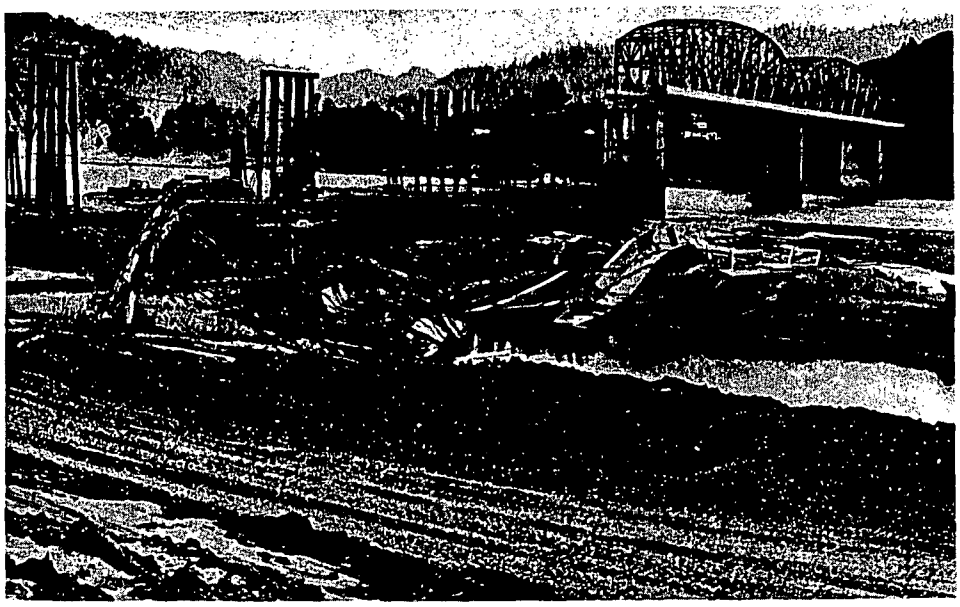
On January 20 Mr. Larry T. Marshall of U.S. Plywood in Eureka wrote Mr. Helwer:

"Today we were greatly delighted to see the first truck and trailer load of plywood roll out of here headed south to join the convoy at Garberville. It was a small beginning, but nonetheless a hopeful one and certainly good for our spirits. Tomorrow we expect to roll five fully loaded rigs. In 10 days or so we can roll nine each day and put all of our people to work."

On the 24th the southbound convoy actually was turned back at Garberville after three inches of rain fell at Rattlesnake Summit, but traffic began moving again the next day. The same day, the North Coast Timber Association announced 12 Humboldt County mills had resumed operation in the previous two weeks and 717 persons had returned to work.

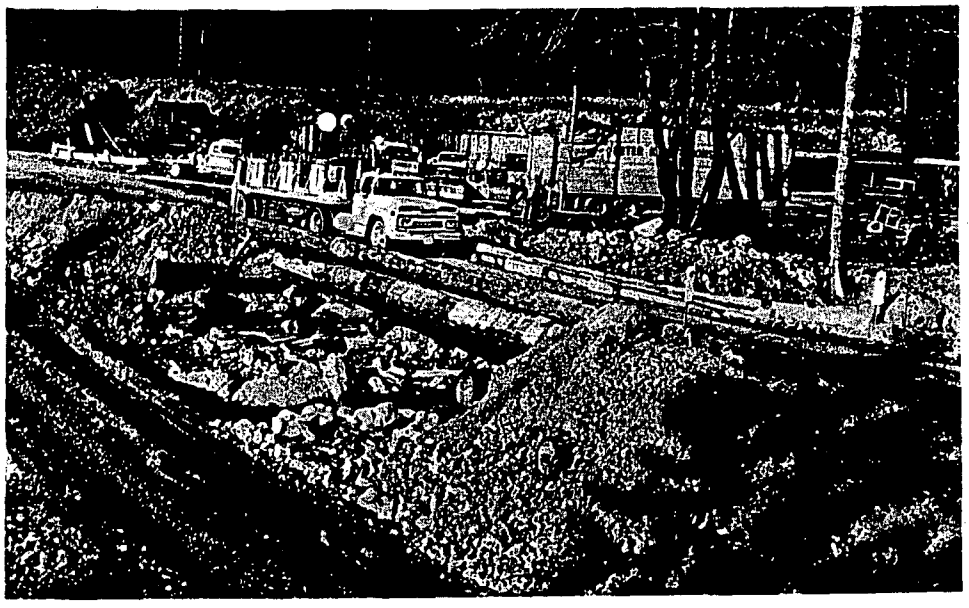
On the 26th there was a massive slide at Piercy, and all movements were held up for 24 hours until it could be cleared. By this time, passenger cars were being allowed in the convoys, and departure times at assembly points were reversed at the request of the truckers.

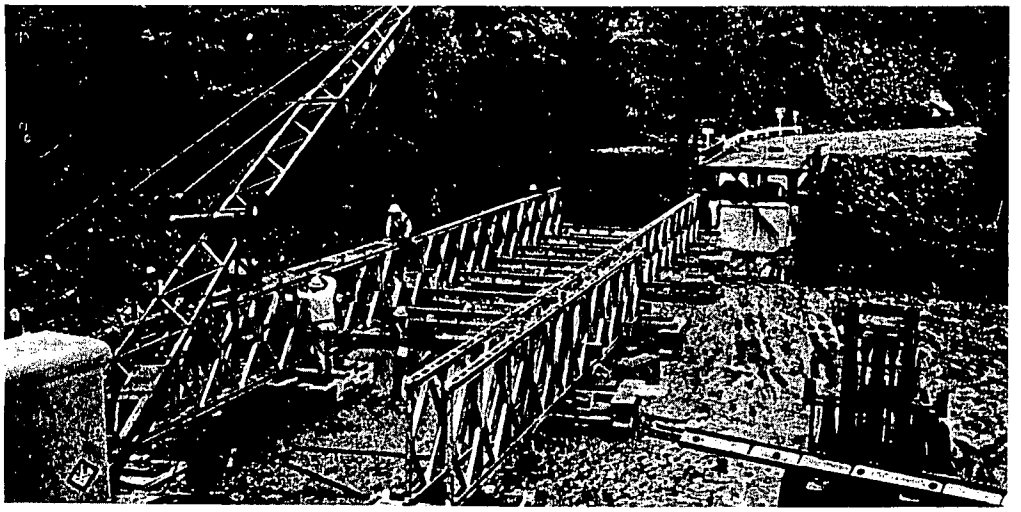
Two days later the convoy system on 101 south of Eureka was dropped entirely, with no restrictions on nighttime travel. On February 2 this portion of the route was opened to 24-hour traffic, subject to delays at reconstruction points, and with speed and single-vehicle restrictions on the damaged bridges at Big Dann and Cedar Creeks.



Repairs going forward on Robinson Ferry Bridge over the Eel. Crews gambled stream would not flood again this winter, and as payoff bridge will be opened to traffic in May. Wreckage of old spans lies in center foreground.

ABOVE: After first building low-level log bridge to move equipment in, contractor here, using front-end loader as crane, puts logs in place for abutment for higher level crossing. BELOW: The finished bridge, crossing Patrick's Creek, US 199.





First girders of Bailey Bridge being assembled to cross Smith River on US 199. As sections are joined they are pushed out over opening by rollers set on the little platforms. (This is bridge seen on back cover.)

There were still problems on the Blue Slide Road. The little temporary bridge at Howe Creek was rebuilt to handle two lanes and opened February 15, but trucks were still having trouble on the new fill and the slippery, steep grades just outside Rio Dell. This delayed other traffic also. On the 18th a contract for surfacing this route was awarded on a low bid of $140,220 and work started on the 19th. Until this paving was completed on March 13, truck double trailer restrictions were imposed.

Contracts for permanent repairs also have been awarded as follows:

Restoring pavement on the Redwood Highway between Rio Dell and the Mendocino county line, $93,960.

Restoring pavement on the Redwood Highway between Humboldt county line and Rattlesnake Creek, $126,720.

Permanent repairs to the Scotia-Rio Dell Bridge, $223,304.25.

Permanent repairs to the Robinson Ferry Bridge. Estimated cost $650,000 but emergency contract let January 5, 1965 on a cost-plus basis.

The contract has been let on the new Richard Fleisher Memorial Bridge at South Scotia to replace the washed-out parallel structure. This is a major bridge contract, for a four-lane bridge 1,025 feet long and with a clearance of 15 feet above the December 1964 high water. Bids were opened in Sacramento March 31, with the low bid $2,020,023. The bridge is expected to be open for traffic on December 15, 1965.

Other contracts will be let, but the road will be in good condition by the current season, with some delays at construction sites.

The other area of major damage on the Redwood Highway was the section of US 199 in the Smith River Canyon between Gasquet and Idlewild. Because of the difficulties of access, work proceeded here at a slower pace than to the south. Also, since much of the traffic on this section in winter is associated with the lumbering industry, inadequate temporary construction would not suffice.

The bridge crossing Patrick's Creek had been destroyed, and the contractor working on reconstruction from that end was authorized to build a log bridge adequate to carry legal loads until completion of already planned reconstruction of the road could be made on new alignment. Three miles south of here another bridge washout was replaced with a Bailey bridge.

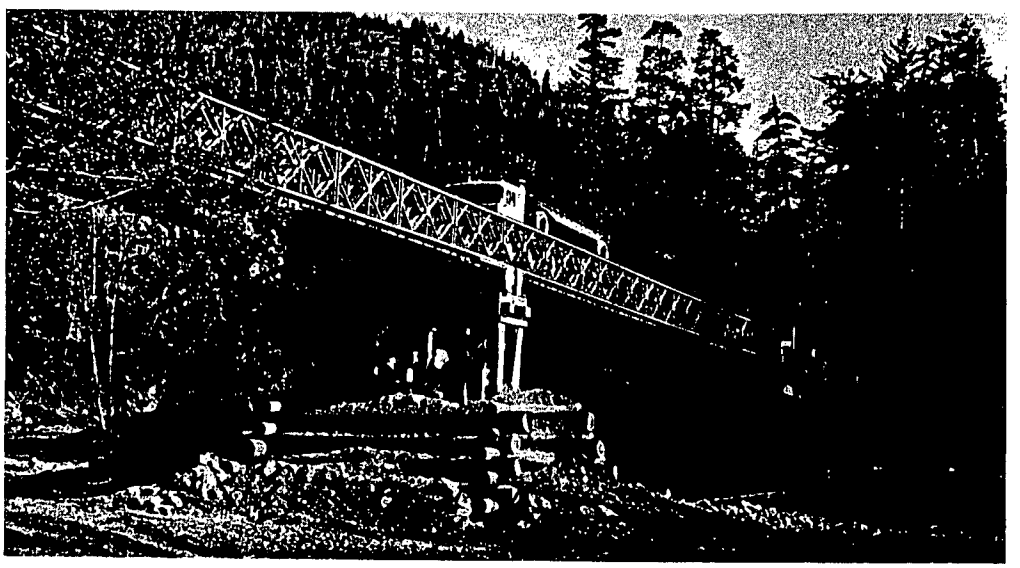
In many places in the canyon reconstruction entailed virtually rebuilding the road, for where the rushing torrents struck the highway on outside curves, nothing was left. Protecting riprap was valueless, for the stream was so high it boiled right over the top of these barriers. This required replacement of many thousands of yards of fill.

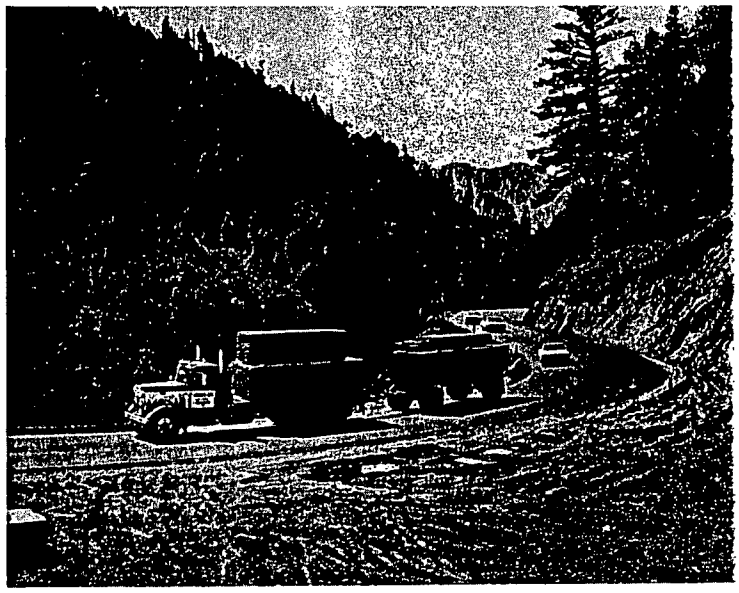
As on the other routes, first movements were four-wheel-drive vehicles, followed quickly by convoys. First vehicle to traverse the road was a U.S. mail truck on the Crescent City-Grants Pass run on January 28. As the bridges and the road were improved, the convoy system was extended. By February 4, convoys were including passenger cars and single unit trucks with legal loads. Semis and trailers were excluded because they could not maneuver around the sharp turn leading onto one narrow log bridge.

On the 14th of February this condition was improved and restrictions were lifted, with the road open to all traffic on a 24-hour basis, subject to delay at construction sites. A newsman who made the trip over this road about this time reported that except for the delays at construction sites, traffic was moving as fast as ever.

On the afternoon of Monday, the 15th of March, representatives of the Greater Eureka Chamber of Commerce and the Chamber of Commerce of Del Norte County gathered at Klamath for a ceremony celebrating reopening of the bridge the night before. This was the last interruption in the roadway, and the Redwood Highway was once again a single entity.

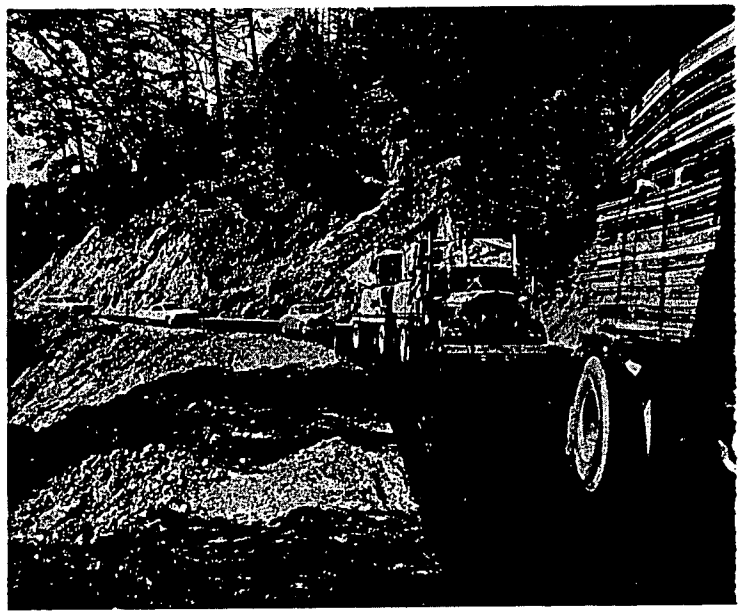
Another Bailey Bridge replacement on US Route 199 across Smith River. This is only one girder high, but can carry legal loads by virtue of center pier.

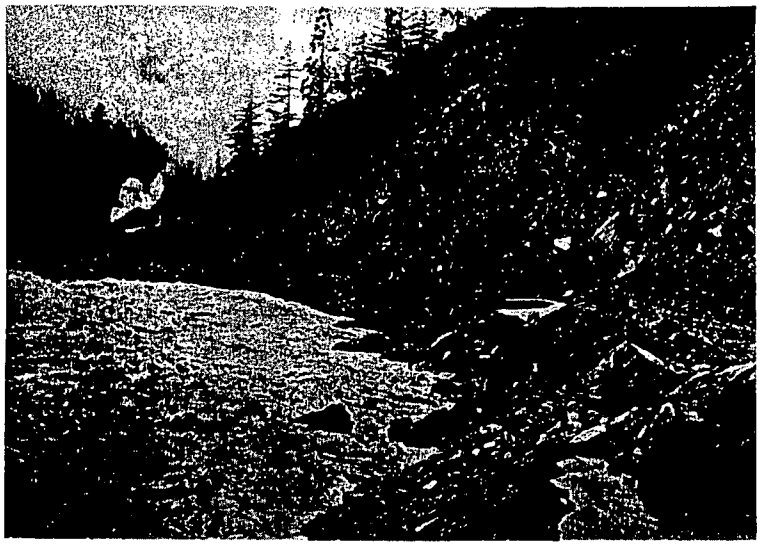


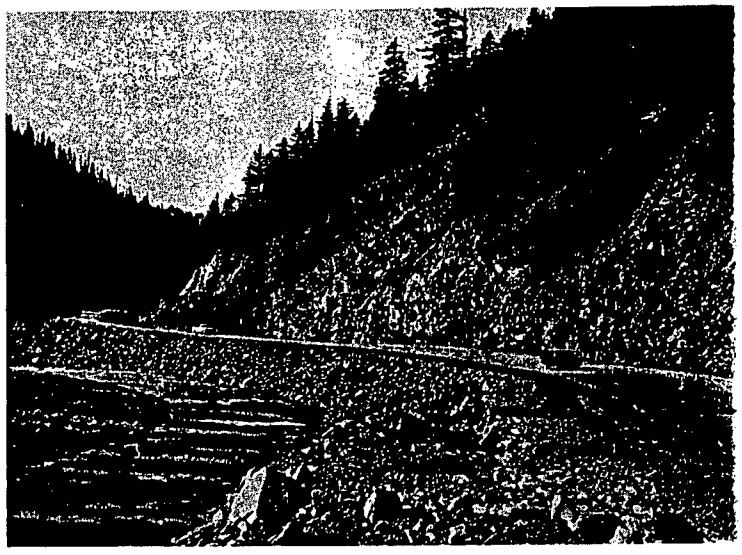


MORE "BEFORE AND AFTER" PHOTOGRAPHS

In addition to those inside the front and back covers, these photos show "before and after" views of destruction on the Redwood Highway, and how it looks since repaired. The two upper pairs are in the Cummings-Leggett vicinity, and about two months have elapsed from "before" to "after." The lower pair shows a section of US 199 in the Smith River Canyon, first in mid-January, then about five weeks later.







Overflow water from Sacramento River passing over weirs into Yolo Bypass during week of Christmas Flood makes Interstate 80 look like causeway to Key West. (Photo courtesy of Vernon Giles, Carmichael Times.)

CHRISTMAS FLOODS

Elsewhere in the State

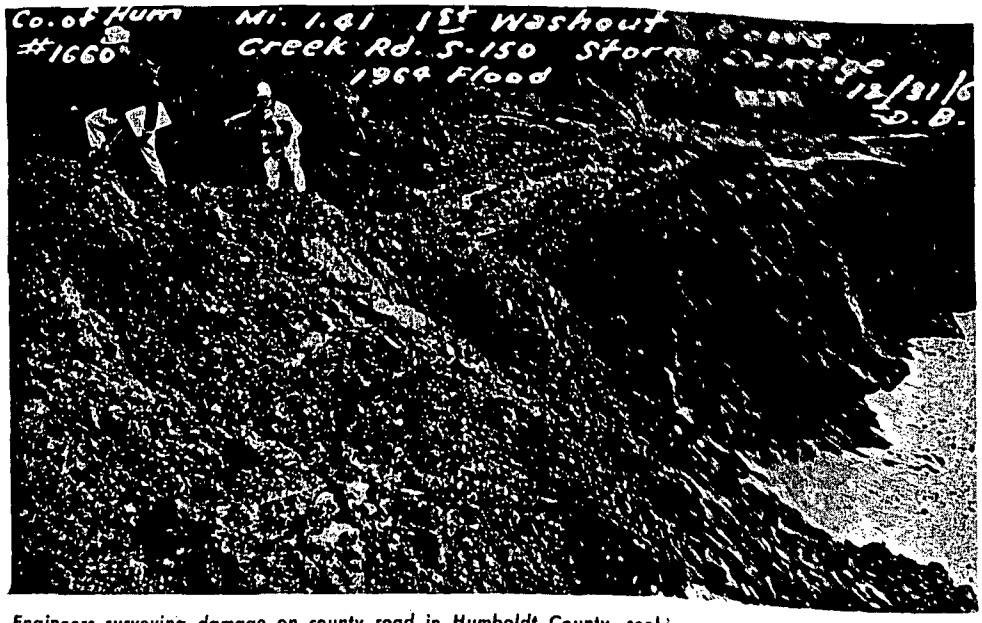
By JOHN ROBINSON,
Information Officer

The storms which devastated the north coastal counties in December 1964 spread eastward and southward across much of northern California. Before they subsided more than a score of counties had been designated as disaster areas, with some of them suffering very heavy damage to both private and public property. Included was bridge and highway destruction running into many millions of dollars.

Damage to state routes was also heavy, particularly in the northwestern quadrant of the state. Not only was the Redwood Highway rendered completely unusable, but so were several other routes such as US 299 between Arcata and Redding, Sign Route 36 between Fortuna and Red Bluff, and Sign Route 96 up the Klamath River.

On most routes there were many temporary interruptions. At one time all trans-Sierra routes were closed by high water, snow or blizzard conditions, except a northerly route via State Sign Route 44 and Susanville.

Along the north coast the heaviest rainfall seemed to strike Mendocino County first, then gradually spread



Engineers surveying damage on county road in Humboldt County, seeking route into Rio Dell, struggle through knee-deep mud along banks of the Eel River. This route is now being used temporarily as part of the Redwood Highway.

Typical damage to county road, Humboldt County.

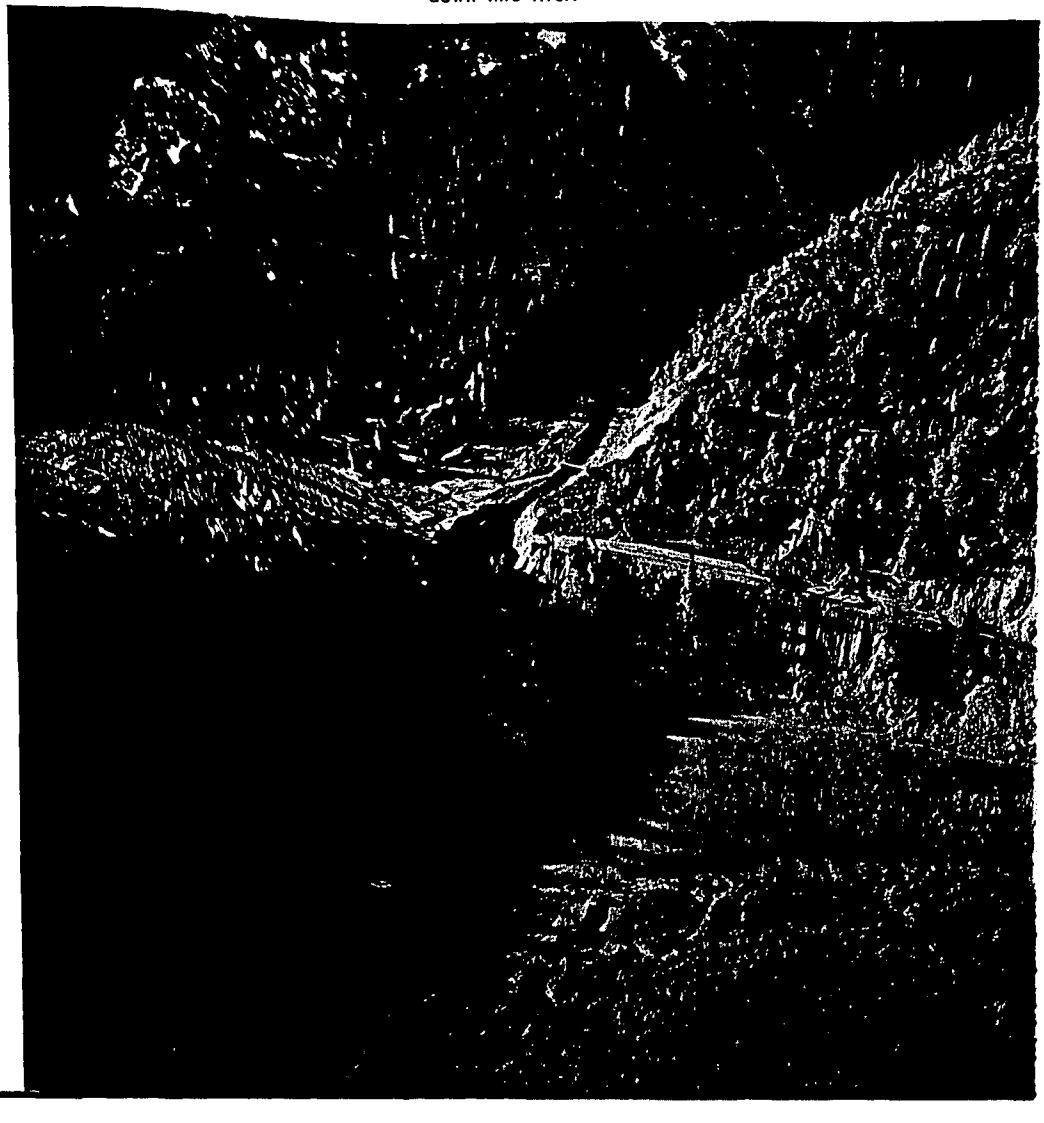
northward and eastward. While several stations near the headwaters of the Eel recorded more than 20 inches for a two-day period, this intensity was not equaled in other parts of the state. Probably there was somewhere around 12 to 16 inches in many parts of the Klamath and Trinity Ranges on these two worst days, which had its effect not only on westward flowing streams, but also on those streams draining eastward into the Sacramento Valley.

Farther to the east, Blue Canyon, west of Donner Pass and on the headwaters of the American River, recorded more than 23 inches of rain for the four days of the worst storm. Most places in the Sierra, however, got only about 12 inches during these four days, but it was over ground already saturated by a series of lighter storms.

The effect of these earlier storms had already been felt by the 21st, when several counties reported road closures from slides and flooding. On the state system, Highway 101 was closed by slides and flooding at Benbow, and State Route 1 was closed at the Garcia River by flooding.

On the 22nd, reports of damage over a wide area were coming in. All roads into Eureka were closed indefinitely. Interstate Highway 80 was closed at Cisco due to flooding. The Southern Pacific Railroad suspended service over the Sierra and north into Oregon where the road was closed at Crescent Lake. Humboldt, Del Norte, Shasta, and Mendocino Counties were declared disaster areas.

The washout at Bluff Creek, across State Route 96 along the Klamath River. Original streambed passes along ledge and out at left center of picture, but flow of water was so great stream broke through solid rock many feet higher than bed and cut new channel across highway. Note detritus carried down into river.



Hospital Creek on Trinity River near Hoopa brought down so much debris it filled channel, and covered highway with gravel several feet thick. This was a common type of damage in this storm, and required reestablishment of the channel in each case. Note creek "delta" in river.

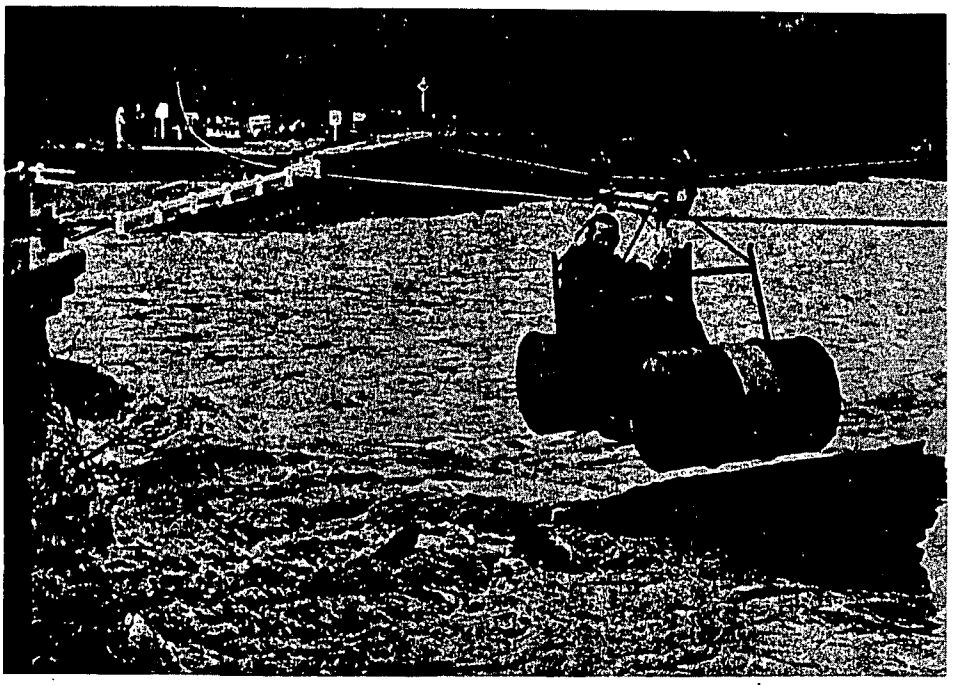
By the 23rd, water had to be released from some dams. Almost every northern county was reporting closures, flooding, and bridge losses. Schools were closed. In many places in the Sacramento Valley the roads on fill were like causeways across inland seas. A contractor working on a highway job near Orland watched one of his pickups as it was swept end over end down Stony Creek. Yuba County lost its new 155-foot Oregon House Creek Bridge, which was under construction and just ready for its final pour.

All the Sacramento River bypasses had to be opened, which flooded many low-level roads. As the storm spread southward, the Tuolumne River flooded State Sign Route 120, and there were slides and flooding on Sign Route 108 in Sonora County. Sign Route 70 in the Feather River Canyon was closed, as was Sign Route 20 east of Nevada City.

All routes connecting California and Oregon were closed. Interstate 5 was closed near the Oregon line by flooding, reduced to one lane at Dunsmuir by a slide, closed on US 99W south

BELOW: Destruction of culvert and road on State Route 96. Trail across top of picture is emergency road. Washed-out culvert can be seen in circled area.

BELOW: Slides and slipouts on State Route 96 left this government equipment (seen in circle) trapped, unable to get out. (Both photos courtesy of Six Rivers National Forest, U.S. Forest Service.)



On December 27 this cable carrier was being used to carry people and small quantities of supplies across Canyon Creek at Junction City. Road in background is US 299. (Photo courtesy of United Press International.)

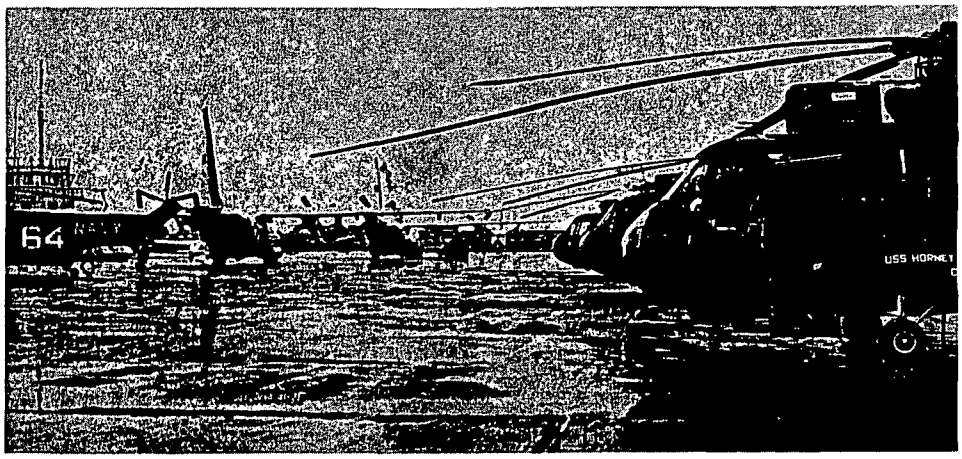
In many places travel by air was the only means of access. A Division of Highways photographer caught here an Army Caribou plane over a destroyed bridge on US 299.

of Red Bluff, and on US 99E between Roseville and Lincoln.

Sign Route 49, traveling through the foothills across dozens of streams, had many closures. Hell Hole Dam, under construction on the Rubicon River in the Sierra, failed and loosed a wall of water which three hours later wiped out the State Sign Route 49 bridge near Auburn. A few miles farther north the fine old covered bridge on the county road at Bridgeport barely missed destruction when the Yuba River rose to the bottom of its housing.

Siskiyou County reported 15 bridges destroyed, and 15 more with damaged approaches. This was later modified, after the water went down, and several bridges thought lost reappeared. All roads in the county were impassable, with heavy flooding on the Klamath, and along the lower Trinity.

Governor Brown telegraphed the President names of 10 more counties nominated as disaster areas. Humboldt County reported nine county bridges destroyed, and the first loss of life in the storm when a road collapsed beneath a jeep, and vehicle and driver were swept away in the Klamath River.



ABOVE: Visible in this photo at the Arcata airport are Air Force, Navy, and private aircraft which provided food and other supplies for the isolated areas for weeks, and made countless rescue and reconnaissance missions. (Photo courtesy of Eureka Newspapers, Inc.) *BELOW: Big, two-rotor Marine helicopter lands on street of isolated Willow Creek. A machine like this carried fuel for equipment to many isolated emergency road contracts. Aircraft even brought in hundreds of tons of feed for Humboldt County's dairy cattle.*

This special congressional subcommittee of the U.S. House of Representatives Public Works Committee toured the flood-ravaged areas of the several stricken western states to get firsthand knowledge of the extent of the disaster. Here photographed at Redding Airport, January 12, 1965, they are, left to right: Congressmen Harold T. (Bizz) Johnson of California; Jim Wright, Texas; Robert E. Jones, Alabama (chairman of subcommittee); California Division of Highways Senior Highway Superintendent Henry Pickrell, District 2; Congressmen Don H. Clausen, California; and William H. Harsha, Ohio.

In Shasta County a hole 70 feet deep and 100 feet wide developed across the four lanes of Interstate 5 at Meers Creek north of Redding, when water undermined the fill. The district engineer commended temporary employees M. D. Crowe and J. C. Garrigus for noticing the pavement beginning to sag at 2 a.m. and standing by to stop traffic.

On the 24th, El Dorado County reported 12 to 20 inches of rain in the Tahoe area during the storm, which delivered 1.2 million acre-feet of water into the lake. Plumas County reported the loss at Chester of the main bridge over the North Fork of the Feather, and heavy flooding across Sign Route 70 below Pulga. Closures on Interstate 5 near the Oregon state line were repaired, and hundreds of cars, plus 14 Greyhound buses, all stalled there for hours, streamed northward.

Storm damage and flooding was widespread over the entire northwestern United States. In California many roads had to be patrolled by sheriff's deputies and California Highway Patrolmen to screen travel over dangerous sections.

Traffic on Interstate 5 north of Yreka was still one-way on the 27th, and US 50 was closed by slides between Placerville and Meyers. Sign Route 70, the Feather River route, was closed by slides 12 miles east of Jarbo Gap. Also closed were Sign Routes 1, 16, 20, 36, 41, 96, 140, 169, and US Routes 199 and 299.

By the 28th the snow level had dropped to the 2,500-foot level in the mountains, with heavy falls in the coast ranges, the Klamaths, the Siskiyous, and the Trinitys, adding to the misery of those isolated, and hampering emergency reconstruction. However, the rainfall at lower elevations slowed, and streamflows subsided, allowing many minor road closures to be repaired. In the north dozens of highway crews were still cut off by bridge and road destruction, but the radio-equipped cars kept a steady flow of information coming into headquarters at Eureka and Redding.

The damage to highways was extensive but generally speaking, the older the road the more closures there were. The narrow, winding roadways are very vulnerable to slides and washouts. Maintenance is difficult in any winter on these older sections. The cut slopes are unledged and steep, and when they become saturated with water, they slide, either covering the road or carrying the road with them.

On US 299, running from Arcata to Redding, this type of damage was common west of Weaverville. There were few bridges in this vicinity to go out, but the failure of the Canyon Creek Bridge at Junction City effectively prevented repair work west of it until a temporary crossing could be built. Between Junction City and Willow Creek there were many slides, slipouts, and washouts. Two washouts were so great they had to be bridged.

From the town of Willow Creek, the road heads west up Willow Creek. When the normally peaceful creek rose to become a roaring torrent, it closed six miles of the highway by undercutting. With the Redwood Highway hopelessly destroyed in dozens of places, repairs in this section between Berry Summit and Junction City were vital to reestablish road communications to Eureka.

Sign Route 36, west of Red Bluff suffered some damage on its eastern sections, and along about 20 miles of its western end there were bad washouts and slides. Three sizable bridges were destroyed on this route, also.

Possibly the worst slide damage in the entire state was on State Highway 96, which leaves US 299 at Willow Creek, then travels down the Trinity Canyon and up the Klamath from the junction of the rivers at Weitchpec. This is very rugged country, with the few settlements directly on the roads.

On the Siskiyou County road along the Salmon River, a slice of mountain half a mile high and three-fourths of a mile wide slid down into the stream, erasing three-fourths of a mile of road and damming the river. When the dam broke, a 90-foot-high wall of water roared downstream. On this

route, 17 miles of road was virtually wiped out.

From Weitchpec, at the confluence of the Trinity and Klamath, uncompleted Route 169 goes part way down the Klamath, to the Town of Pecwan. Over two-thirds of this road was destroyed.

Bridge damage in the Klamath-Trinity drainage area was heavy. The bridge at Willow Creek, connecting Route 96 with US 299 was completely destroyed, as were several other state bridges on this route. In the Weitchpec-Orleans-Somes Bar vicinity, every bridge was destroyed, both state and county.

Included was the state bridge at Somes Bar and the beautiful prize-winning suspension span at Orleans, the fine county bridge at Martin's Ferry which gave access to the county road to Orrick and US 101 and the jewel-like little Forest Service suspension bridge at Ishi Pishi. Upstream there was further bridge damage, and all along the canyon terrible road damage. When the flood subsided, people who lived in these communities could be provided with food and supplies only by helicopter.

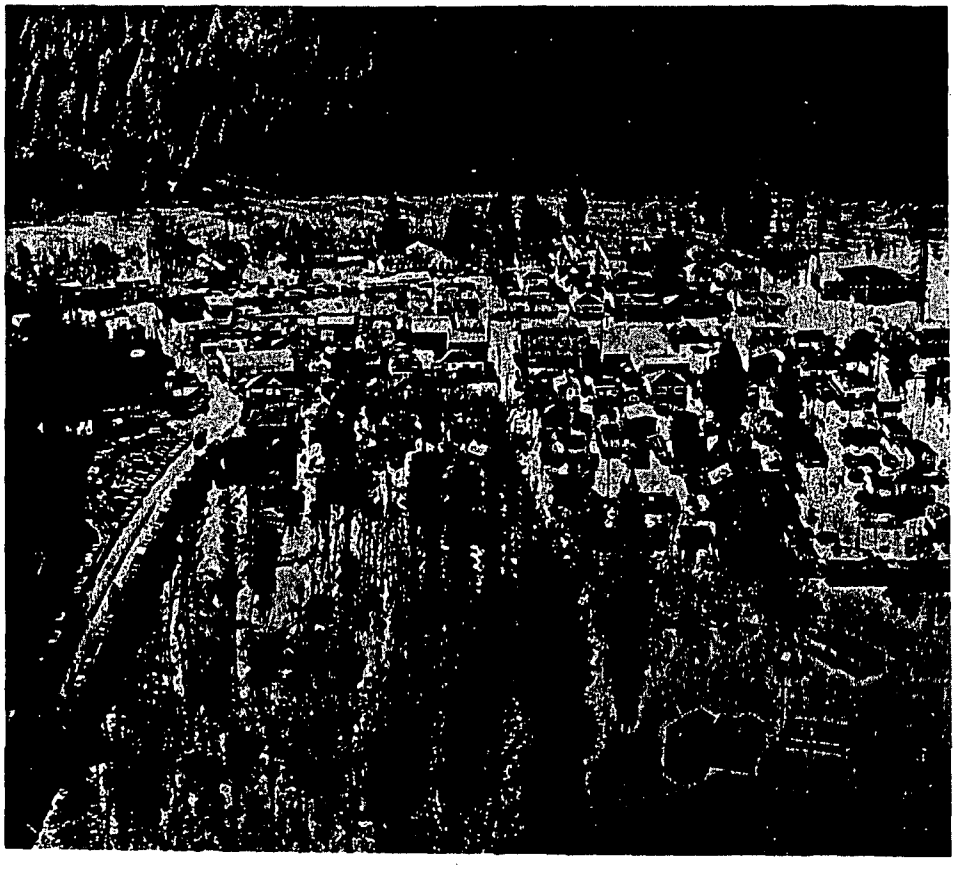
Gaping washout from what is normally an insignificant trickle of a stream is typical of damage throughout the several northwestern counties in the December 1964 floods. This is State Route 208 in Mendocino County, west of Leggett.

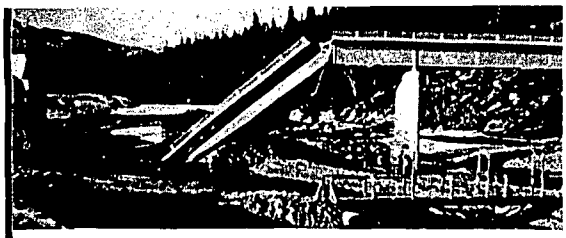
Mendocino County suffered very heavily, both from the Russian and Eel Rivers. Damage was particularly heavy in the vicinity of Covelo and Dos Rios around the main Eel and its North Fork. Here also the railroad suffered heavily. These are examples of some of the worst hit areas. Many other counties suffered damage, some of them substantially. The photos herewith tell the story better than words.

County losses alone, ignoring state losses, on first estimates, totaled 340 miles of roadway, and 104 bridges. The table below lists these losses; and their dollar value:

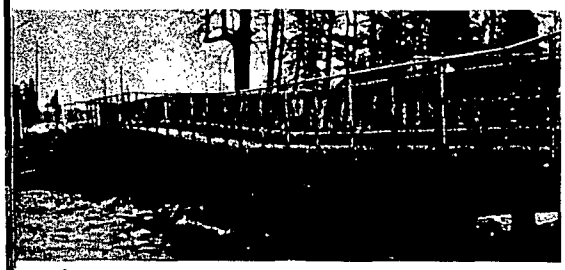
County	*Cost*	*Miles road*	*Bridges*
Butte	$112,000	2	
Colusa	166,000	10	
Del Norte	1,940,000	25	5
El Dorado	142,000	5	4
Glenn	258,000	2	1
Humboldt	6,200,000	20	21
Lake	550,000	6	9
Lassen	17,000	3	
Mendocino	6,650,000	110(?)	14
Modoc	23,000	3	1
Napa	113,000	2.8	1
Nevada	52,000	.1	1
Placer	293,000	2	1
Plumas	217,000	5	2
Shasta	327,000	7	4
Sierra	200,000	10	3
Siskiyou	2,368,000	60	20
Sonoma	566,000	6.1	2
Tehama	335,000	8	5
Trinity	2,030,000	50	10
Yuba	124,000	2.5	1
Total	$22,683,000	339.5	104

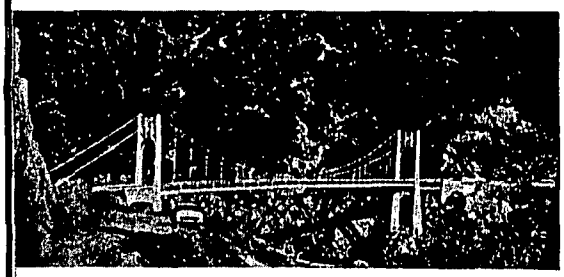
Guerneville in Sonoma County from the air on December 24, 1964, while Russian River was in flood. State Route 116 travels across photo about one-third the distance from the top. (Photo courtesy of Santa Rosa Press Democrat.)



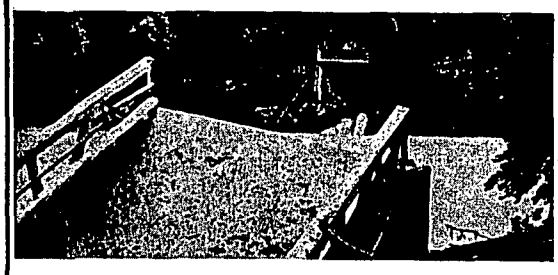


ABOVE: One of the more than 100 county bridges damaged. This is Trinity County's Carrville Bridge over the Trinity River. BELOW: The damaged Feather River Bridge, Chester, Plumas County. (Photo courtesy of Feather River *Bulletin.*)

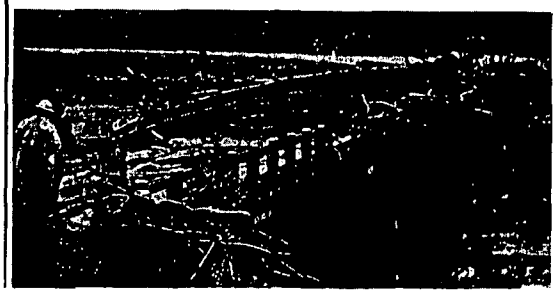


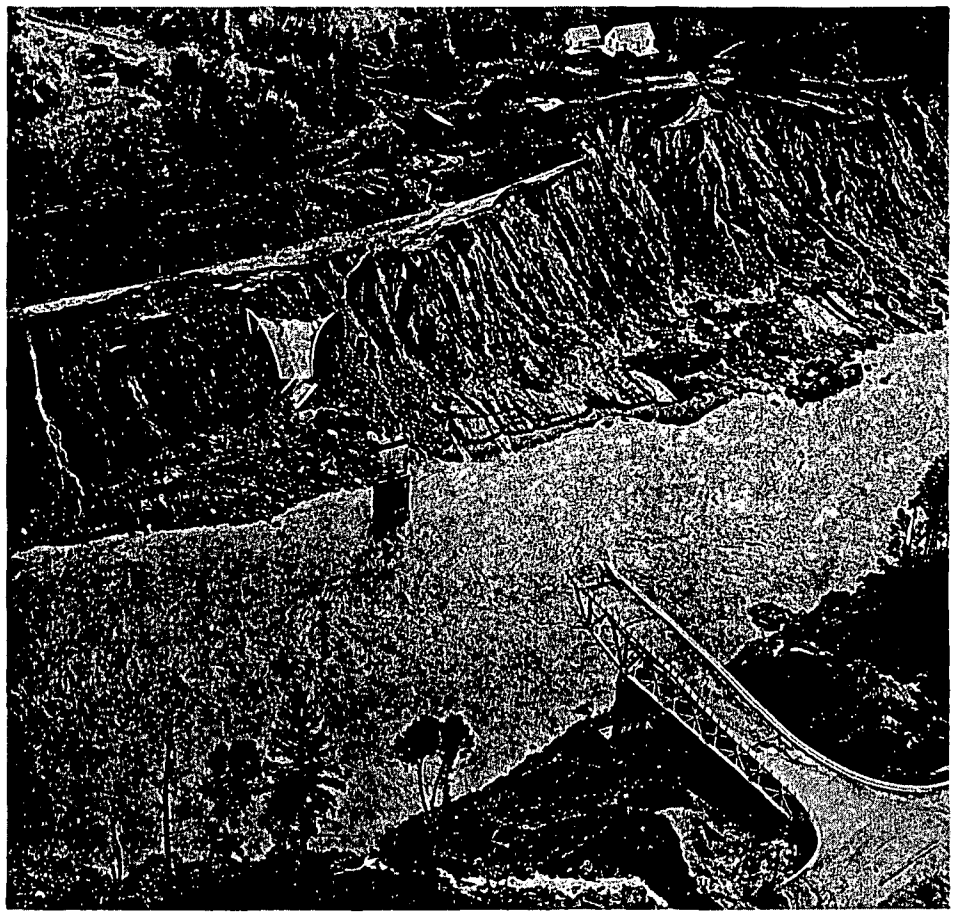


ABOVE: "Before" photo of the Forest Service Bridge across the Klamath River at Ishi Pishi, on the Humboldt-Siskiyou county line. BELOW: "After" photo of same bridge, showing only abutment remaining, indicates height and power of flood in Klamath Canyon.



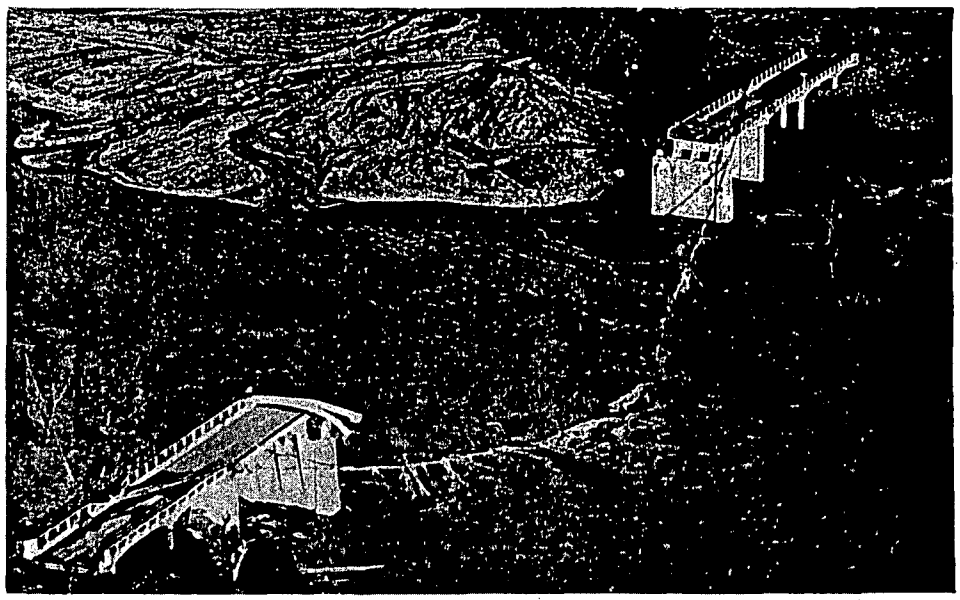
ABOVE: Whittemore Bridge on Federal Aid Secondary Route 977 in Humboldt County. BELOW: This Mendocino County bridge across the upper Eel River on road to Covelo withstood flood despite debris. (Photo courtesy of Santa Rosa *Press Democrat.*)



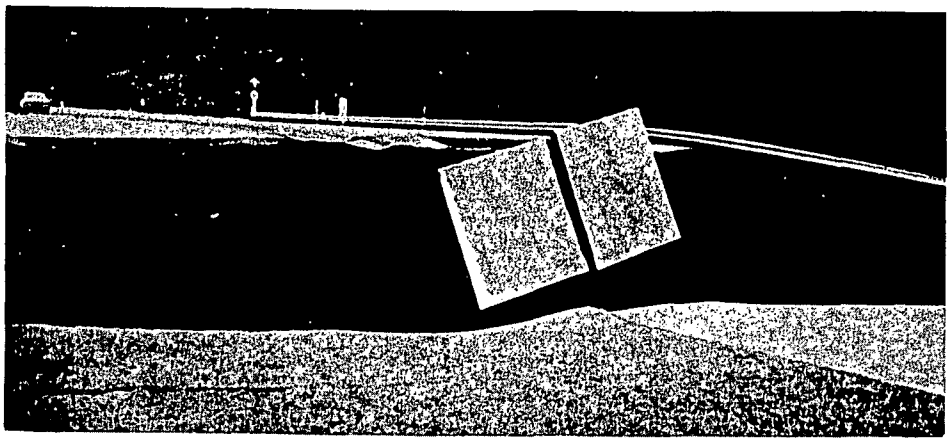


This photo of destroyed Martin's Ferry Bridge, on Humboldt County route between US 101 and Klamath River towns, clearly shows power of the Klamath in flood. Top of pier on other side of stream is 95 feet above normal river flow and subsiding waters left driftwood on it. River height here is estimated to have reached somewhere between 110 and 115 feet. Note also washouts and undercutting of cliffs in upper right which previously supported the road. (Photo courtesy of Eureka Newspapers, Inc.)

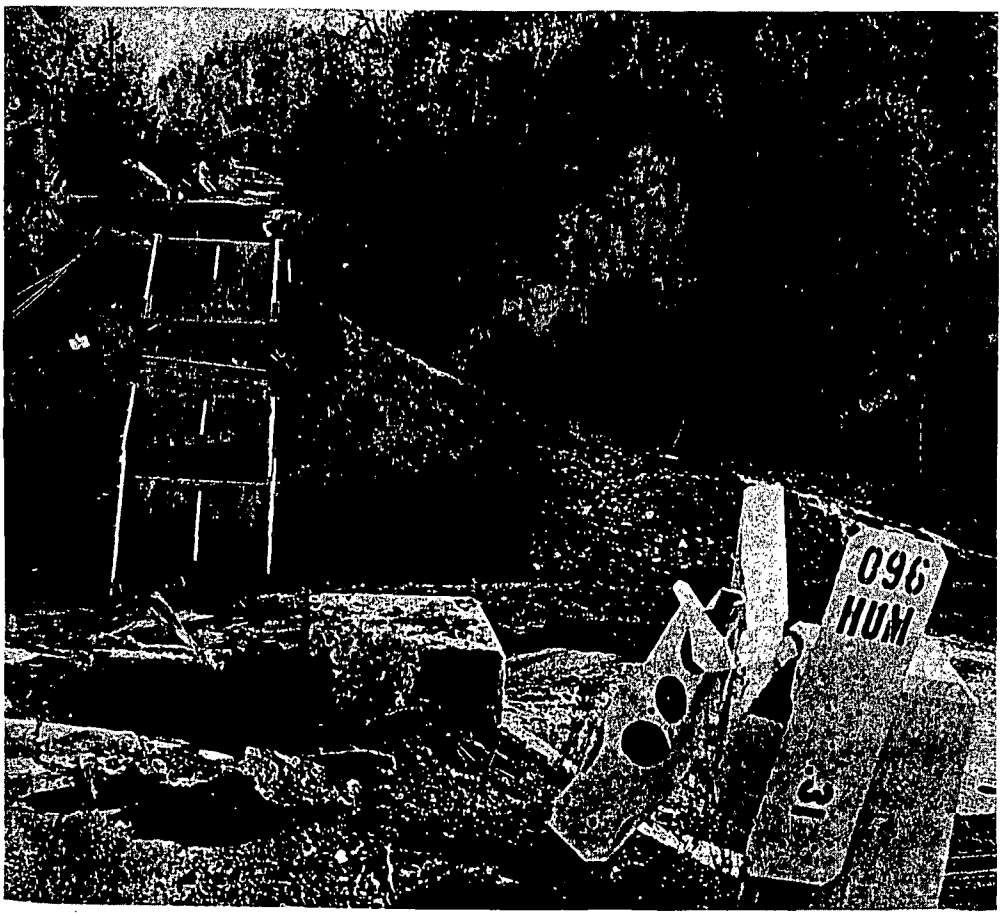
BELOW: Until December, this was the beautiful State suspension bridge at Orleans, which won an award for design in 1940. Flood topped deck before bridge gave way. (Photo courtesy Six Rivers Forest, U.S. Forest Service.)

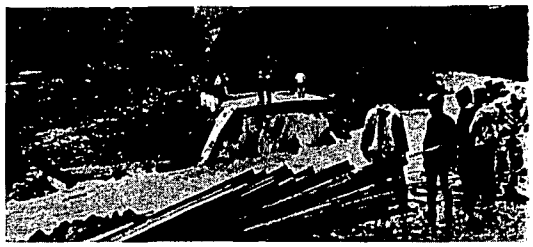


ABOVE: Damage on Humboldt County road from flooding Sprowel Creek, December, 1964. BELOW: Mears Creek washout, Shasta County, on Interstate Route 5, December 23, 1964. Highway foreman happened to have camera focused and cocked when two-lane piece of paving broke off and fell.

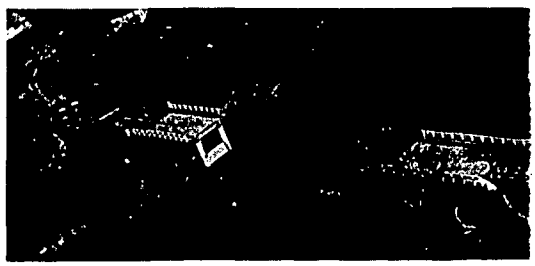


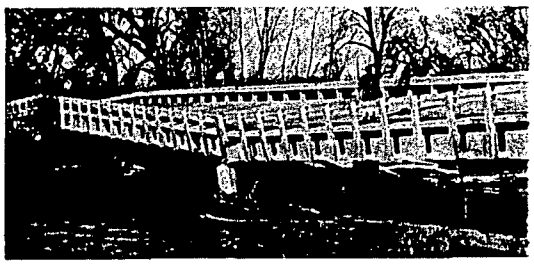
BELOW: Collapsed bridge at Willow Creek, on State Route 96, near junction with US 299.



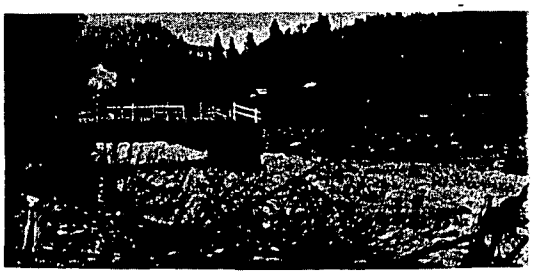


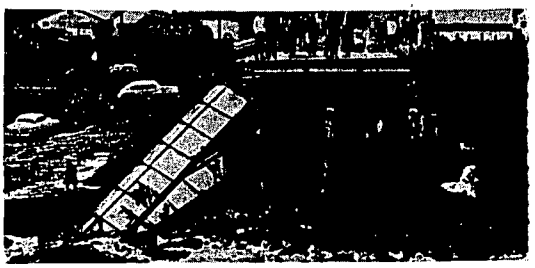
ABOVE: Washed-out Cold Creek Bridge, State Sign Route 20, Mendocino County, east of Calpella. BELOW: Thomas Creek Bridge on county F.A.S. Route 1078 near Paskenta, Tehama County.



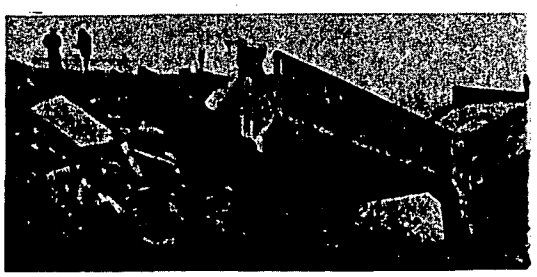


ABOVE: Pier settlement, county bridge over South Fork of Cottonwood Creek, Evergreen Road, Tehama County. BELOW: Partly destroyed Oregon Creek bridge, Celestial Valley Road, five miles south of Camptonville, Yuba County.





ABOVE: Looking across gap of fallen North Fork of Russian River Bridge at Calpella. Severance of utility lines disrupted telephone service for entire area. (Schroll Studio photo courtesy of Santa Rosa Press Democrat.) BELOW: Stephens Bridge over Cache Creek, Yolo County, 5½ miles west of Woodland.



Opening a Lifeline

Temporary Bridges, Mud, Machines and Hard Work

By JOHN ROBINSON, Information Officer

In the aftermath of the Christmas 1964 floods, came an associated economic problem for the areas isolated by the destruction of the transport system. It was a simple chain reaction. If the industry of the affected counties, 75 percent timber products, could not get its production to market, production must cease as soon as all storage facilities were filled. Within two weeks, this was costing the area about $75,000 a day.

The areas of worst damage were in the State Division of Highways District 1, and western portions of District 2. This included Del Norte, Humboldt, Mendocino, Trinity, Siskiyou, and portions of Shasta and Tehama Counties, all of which had isolated sections, some hopelessly cut off from outside help.

Although there were emergencies everywhere, it was obvious that a major object of highway workers must be the earliest possible reopening of a highway "lifeline" into and out of the isolated region.

In the initial phase of reconstruction of transport, the same factors that hampered other agencies hampered the highway employees. With the breakdown of vehicular travel, inspection trips that previously took hours suddenly took days. Mud covered the roads, in the form of slides and slumps from rain-softened slopes and knee-deep silt left by receding waters.

While the State Highway vehicles had a well-organized radio system, it sometimes has "blind" spots in mountainous terrain. Also, many telephone lines had been destroyed. It took a few days to get complete information on which to base decisions, particularly since most early efforts were devoted to opening emergency routes where possible, evacuating trapped motorists, bringing out the sick and injured, and trying to move vital supplies into isolated communities.

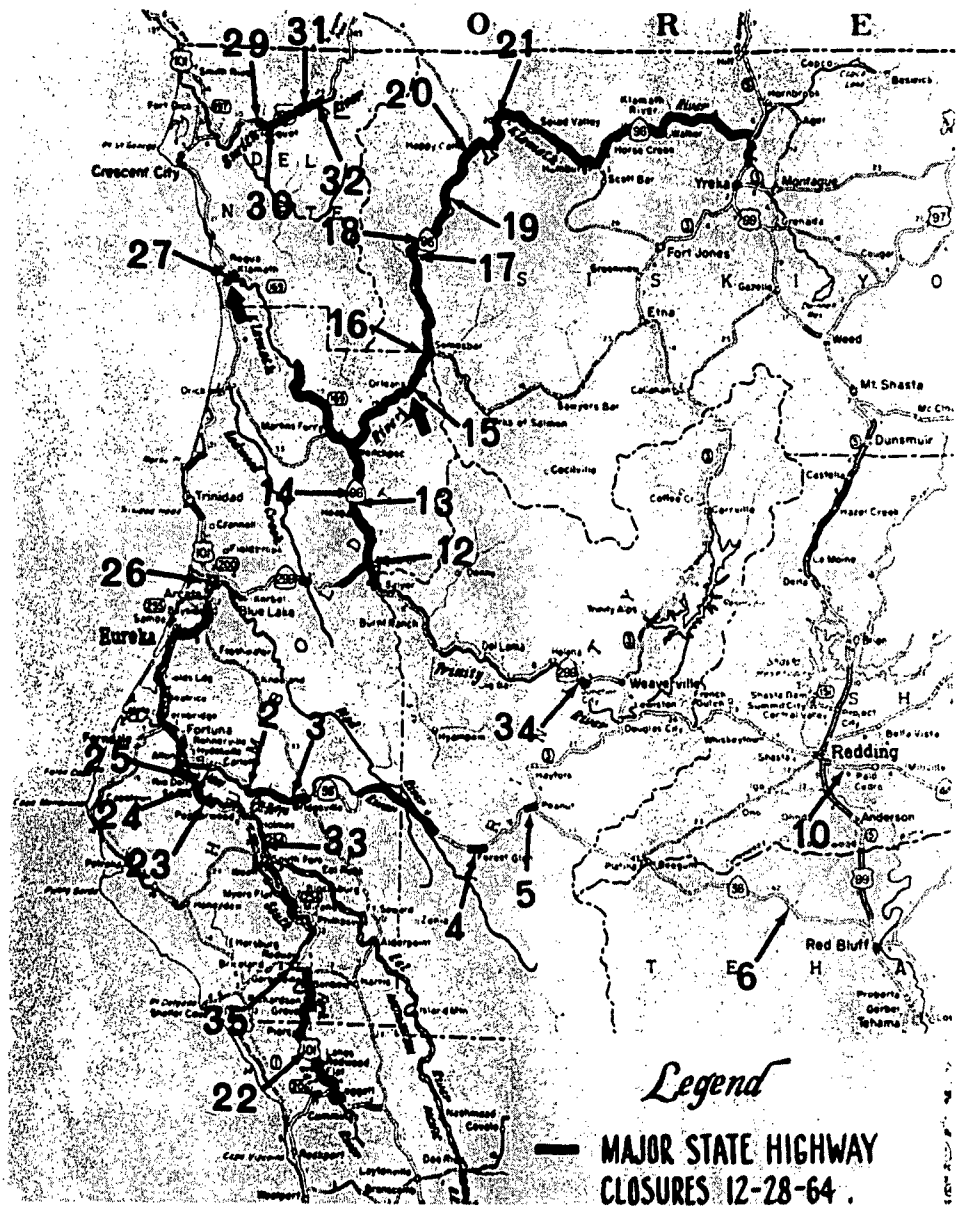
As more and more aircraft moved in, they took over these emergency transport functions. In many cases, ground transport was literally impossible, no matter how geat the effort; and had it not been for the prompt arrival of the aircraft, particularly the helicopters, there would have been much greater privation and suffering.

Helicopters and light aircraft were chartered by the Division of Highways in a number of instances to ferry in small groups of employees with the necessary authority to organize emergency contracts with whatever local equipment was available. Because this was logging country, there usually was enough.

When practicable, these "guerrillas" had radios with them for communications, but these had "blind" spots also. One engineer was dropped in at the town of Ti-Bar, far up the Klamath, and then was unheard from. A few days later a low-flying aircraft reported considerable truck and bulldozer activity on the roads in the vicinity, so it was assumed he was on the job.

The log emergency bridge at Willow Creek on January 7, 1965. At upper left is collapsed bridge. Photo on opposite page made same day gives aerial view of this area.

View from air of break at Willow Creek Bridge on State Route 96, emergency log bridge and collapsed bridge in center. Trinity River at lower left, town of Willow Creek and Route 299 top of picture.



Situation map, northwestern California, on December 28, 1964. Heavy lines indicate sections of severe damage. Note that all of Routes 96 and 169 are severely damaged. Numbers indicate huge slides or bridge destruction. No. 34 marks bridge destruction at Canyon Creek on Route 299, No. 2 to 6 inclusive, serious bridge or highway destruction on Sign Route 36. (See page 18.)

BELOW: Workers from various agencies clearing highway on Christmas Day. This is State Route 36 at Alton, near its western terminus. (Photo courtesy Eureka Newspapers, Inc.)

By December 24th, teams from Eureka and Redding were out on foot surveying many of the damaged sections, and reporting in by radio or telephone, whichever was most readily available. It was data from these reports added to those coming in from the maintenance stations, that began to fill in the picture of the damage so that a plan of action could be decided upon. On Christmas Day reports were in on most of the routes, and the picture was bleak.

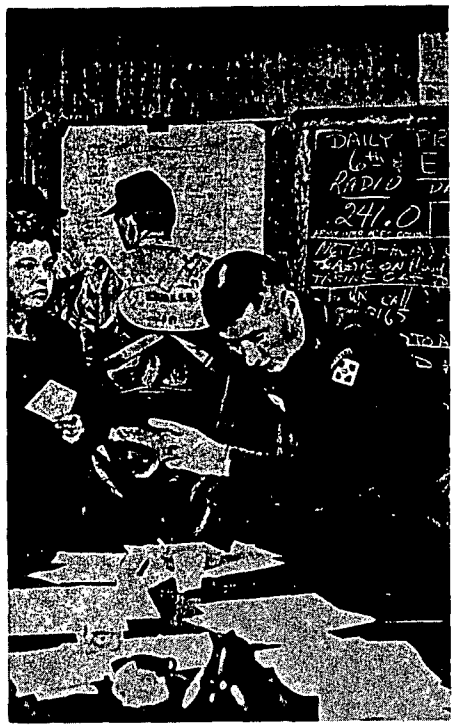
Obstacles on the Redwood Highway to the south included damage to two major bridges which made them unusable without substantial repairs, and great sections of highway washed out and slipped out farther up the Eel River, which meant weeks of laborous reconstruction. To the north the 440-foot gap in the Klamath River Bridge effectively stopped traffic, for the stream was too deep and strong for any quick, temporary bridging.

At Willow Creek, where State Route 96 joins Route 299, a bridge spanning the creek was completely destroyed, and Route 96 beyond this point was impassable at dozens of places. In addition, a number of bridges over the Klamath River were gone. Included was the state's suspension bridge at Orleans, the county's large deck truss bridge at Martin's Ferry, the Somesbar Bridge and the Forest Service suspension bridge at Ishi Pishi, near Somesbar. At best a winding, two-lane road, Route 96 had to be eliminated as an outlet possibility. For the same reasons Sign Route 36 was also eliminated.

On Route 299 there was extensive damage east of Eureka in Willow Creek canyon; six miles virtually washed away, isolating the town from the west. There was a bridge out west of Weaverville, at Canyon Creek, and massive washouts at Grey and Pony Creeks. There were several large slides as well, but compared to the Redwood Highway, the possibilities of reconstruction were much better.

It was thus apparent to the District 1 staff in Eureka that the best hope of reestablishing communications from that city to the rest of the state was via Route 299 east from Arcata

Family with sick child being evacuated by light helicopter for treatment at Eureka.



Operations center at Rohnerville Airport during the first days of operations when many rescue missions were flown.

to Redding. Since District 2 headquarters was in Redding, substantial help from that end could be depended on. The decision was made to concentrate the greatest effort on this route, with crews working on both ends, and using further emergency contracts within the stretch where possible. At the same time, efforts were continuing to organize emergency contracts on other routes, particularly the Redwood Highway, as this was a more direct route to the San Francisco Bay area.

Although Route 299 seemed the best choice for early results, this by no means meant it was going to be easy. From the Eureka end, District 1 crews struggling to replace the road base fought heartbreaking conditions. Several times big sections of the wet fill slid away into the stream, and on other occasions heavy rains caused the stream to rise and wash away the fill footings.

From the Redding end, District 2 crews struck a series of major obstacles. Each of these had to be tackled in sequence. An account of these operations gives an understanding of what was entailed in reopening the roads in these northwest mountain counties.

The first major obstacle was the 200-foot gap left by the washed-out five-span bridge over Canyon Creek at Junction City, still nearly 50 miles from the town of Willow Creek. The only possible detour, a county road and bridge upstream, was also completely destroyed. On December 24, material for a 170-foot Bailey bridge was ordered shipped to Junction City to replace the damaged bridge.

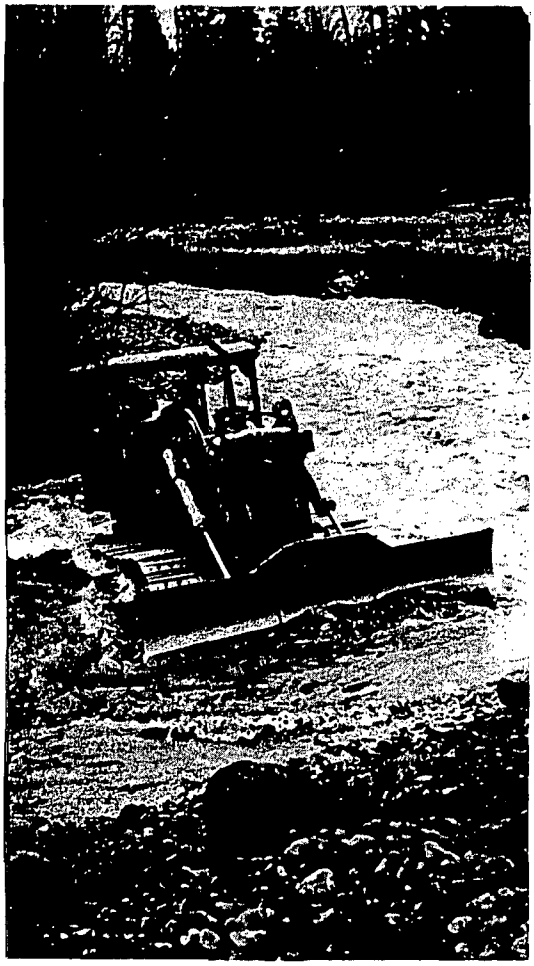
On the 25th it was decided the road could be opened more quickly by using the county road as a detour and on the morning of the 26th two tractors, one with blade and the other a blade plus ripper, were at the site ready to go to work. A drill crew of state workers arrived that morning also, and, with the tractors and drillers working as a team, by the next morning had blasted a bulldozer trail across nearby bluffs to give access to the abutments of the washed-out county bridge.

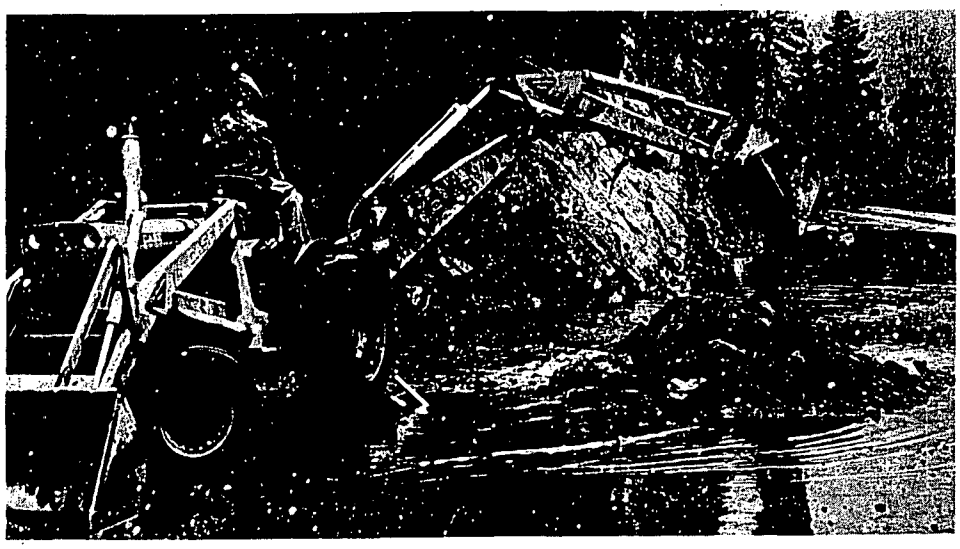
That same day two 61-foot steel beams and other necessary material for the bridge were moved in, and by 8 o'clock the next evening a one-lane bridge was ready to handle emergency traffic. The equipment was then used to widen and improve the detour road.

Although the next 30 miles toward Willow Creek had several large slides, much debris, and one large washout, it was traversable, with caution. The crews then came to a point

Breeches buoy rigged at Willow Creek Bridge to carry people across during first days of recovery after flood. Note debris and silt left by receding stream. (Photo courtesy of Eureka Newspapers, Inc.)

ABOVE: Portable drill rig in operation on Route 299 making holes for charges to blast cliff away to widen road. BELOW: Tractor and blade clearing debris from streambed to increase runoff.





Light backhoe working in snowstorm, clearing drain on Route 299.

Young highway engineers from Eureka standing by at airport as helicopter pilot loads extra gasoline for flight into Somesbar far up Klamath River. Many small groups such as this were sent by air or on foot to organize emergency road repair contracts in isolated areas.

Boulder which slid down mountainside onto Route 299 must be broken up by blasting before removal.

just east of Grey Creek where another major obstacle, actually a double one, was encountered. Here, where the road travels a ledge along almost perpendicular cliffs several hundred feet above the Trinity River, a huge rock slide had completely covered the road, and the boulders were still dropping from the high cliffs above.

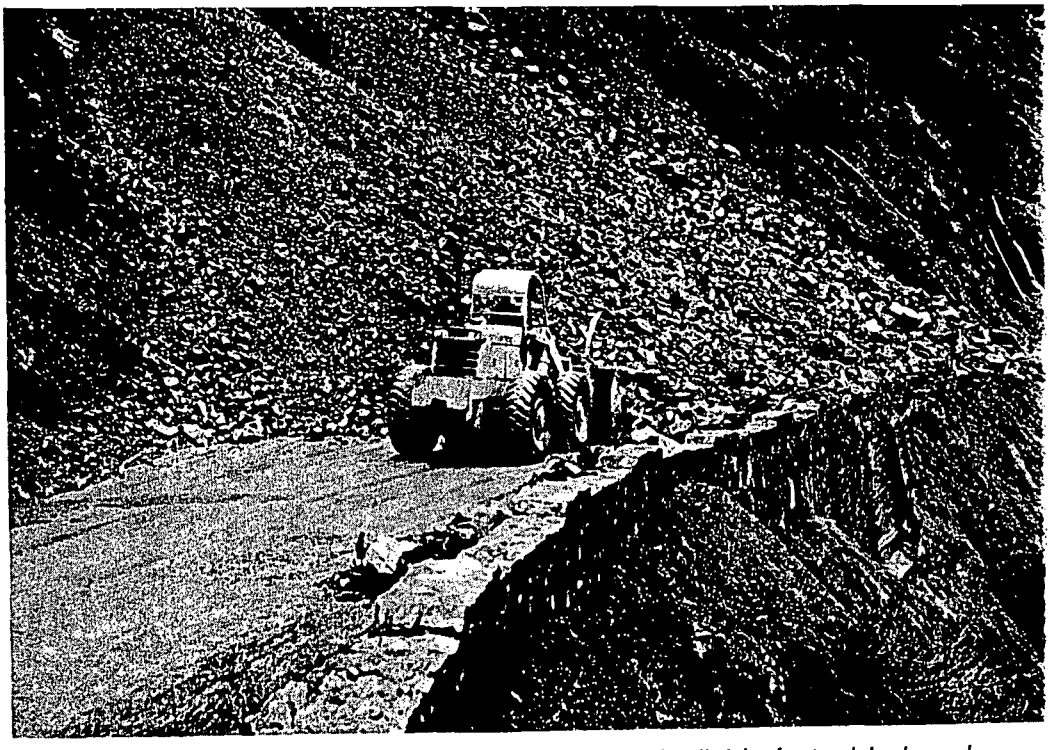
An emergency contract with equipment from a local lumber company was organized, and clearing operations started. These were hampered by the rocks which showered down unexpectedly from time to time.

Five hundred feet west of this slide, drainage had clogged, and Grey Creek had cut a gap 180 feet wide and 170 feet deep across the road. Upstream a slide of millions of yards of earth precluded any chance of constructing a detour road around the opening. When the highway crews arrived, local residents had strung a rope across the ravine which enabled foot traffic to go hand over hand along the rope, wading the creek en route.

The Bailey bridge components ordered for Canyon Creek had arrived in Weaverville on the 28th on five truck and trailer units, and it was decided to use this bridge at the Grey Creek gap. Because the long units could not negotiate the sharp turns on the Canyon Creek detour, the material was reloaded onto three-axle dump trucks. This division split the bridge into 25 loads instead of 5, but by the 30th all the parts were at the site.

The Bailey was not long enough to cross the entire gap, so it was necessary to lower the approaches on either side to reduce the span. A crew had managed to build a dozer trail across a bad gap west of Pony Creek the day before, so that there were tractors available at both sides working as the bridge material was brought up.

On the night of the 30th work on excavating and leveling both approaches was finished, and at 10 a.m. on the 31st construction of the Bailey bridge began. By this time, it had been decided to first complete only a double-girder span adequate for vehicles up to 10 tons so that critically ill persons could be evacuated, with the third girder added later. This saved 36 hours, and the first vehicle crossed at 7 p.m. on January 2.

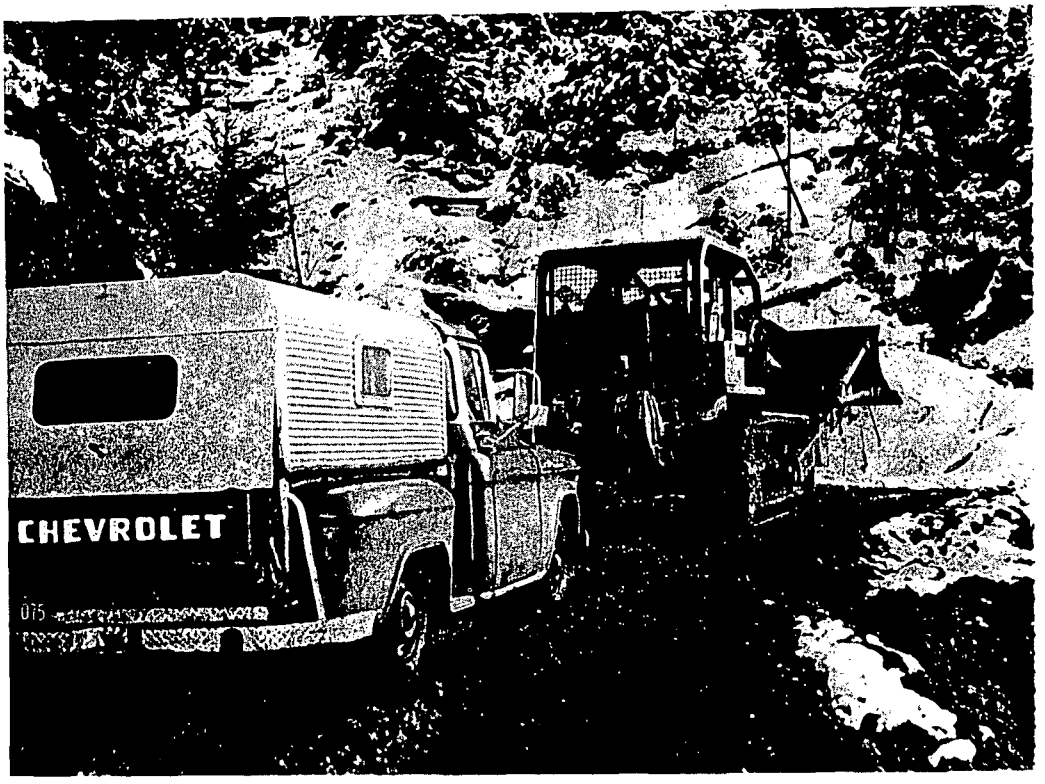


Small slide such as this on precipitous section of Route 299 can be handled by front-end loader and few trucks. This material is good for subbase and will be used for fill.

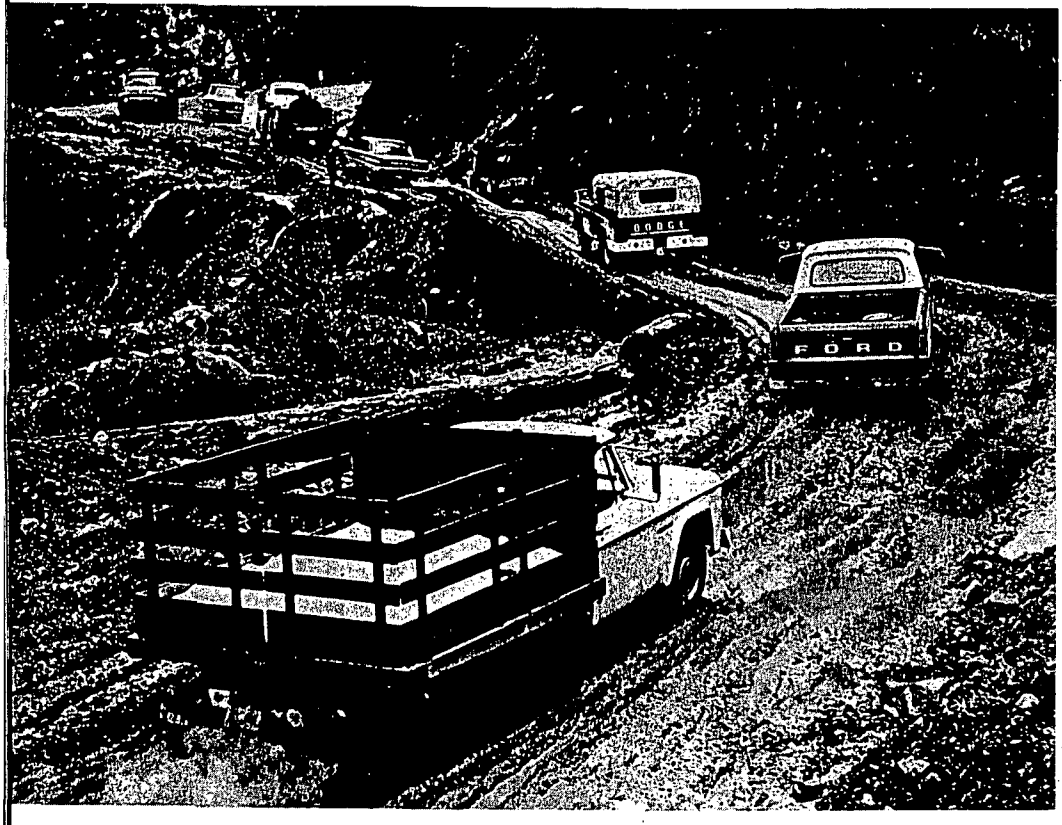
A 170-foot span across the gap had been constructed in 57 hours, and the road was open as far as Willow Creek. In the next three days an additional girder was added, increasing the capacity of the bridge to a normal 45 tons and a cautionary 60 tons.

During the entire operation the crews worked around the clock, stopping to eat and sleep when they finally were compelled to, then returning to the job. From December 28 to January 3 it rained and snowed continuously—sometimes as much as 10 inches of snow overnight. Drinking water had to be boiled, and there was no housing, although one lodge owner agreed to open up and provide meals and sleeping room. There was no electricity, and candles and kerosene lamps were necessary. A big kettle of hot soup or stew was brought to the jobs for the evening and midnight

In first days of opening emergency route, assistance from tracked tractors was necessary in places.



ABOVE: Convoy of evacuees working its way around detour on Route 299 at Junction City on December 28, 1964, over one-way bulldozer road. BELOW: Westbound convoy on Route 299 January 7, 1965, at Pony Creek. Note logs used as guardrails and delineators.



meals, and six banks of floodlights powered by portable generators provided illumination.

On the western end the District 1 crews also had been busy, although fighting the same kinds of conditions. By the 2nd of January emergency traffic could get through to Redding from Willow Creek. On the 5th a convoy system of four-wheel-drive, high-clearance traffic was started, but this was interrupted immediately. Snow in the mountains changed to rain, and the Trinity River rose six feet. Pony Creek, just west of the Bailey bridge at Grey Creek, washed out the log bridge and temporary fill there, cutting a gully 100 feet deep and 60 feet across. By 9 a.m. crews were at work on the gap, cutting trees and refilling the road, and 12 hours later trucks were moving across a newly constructed log bridge, although it was only nine feet wide over a 100-foot drop. The next day it was improved to a "good" one-way span.

The road still was open only for emergency traffic in the strictest sense —essentially four-wheel-drive vehicles or powerful units which could negotiate the deep mud and slippery grades on the hastily built road. About the same time a similar road was opened by dint of log bridges and bulldozer trails along Route 96 to the Hoopa Valley.

From this point on, with occasional minor setbacks, progress was continuous. Although there were one or two heavy rains, they did not persist, and the weather, as though repentant for its December violence, remained better than normal.

The Redwood Creek Bridge, on Route 299 west of Berry Summit, was a problem because of slide damage! A mud slide oozing down the side of the canyon actually pushed the abutment out of line, requiring recasting of broken concrete and placement of heavy rock to stop the slide. During this period the bridge damage kept load limits down to 10 tons on Route 299.

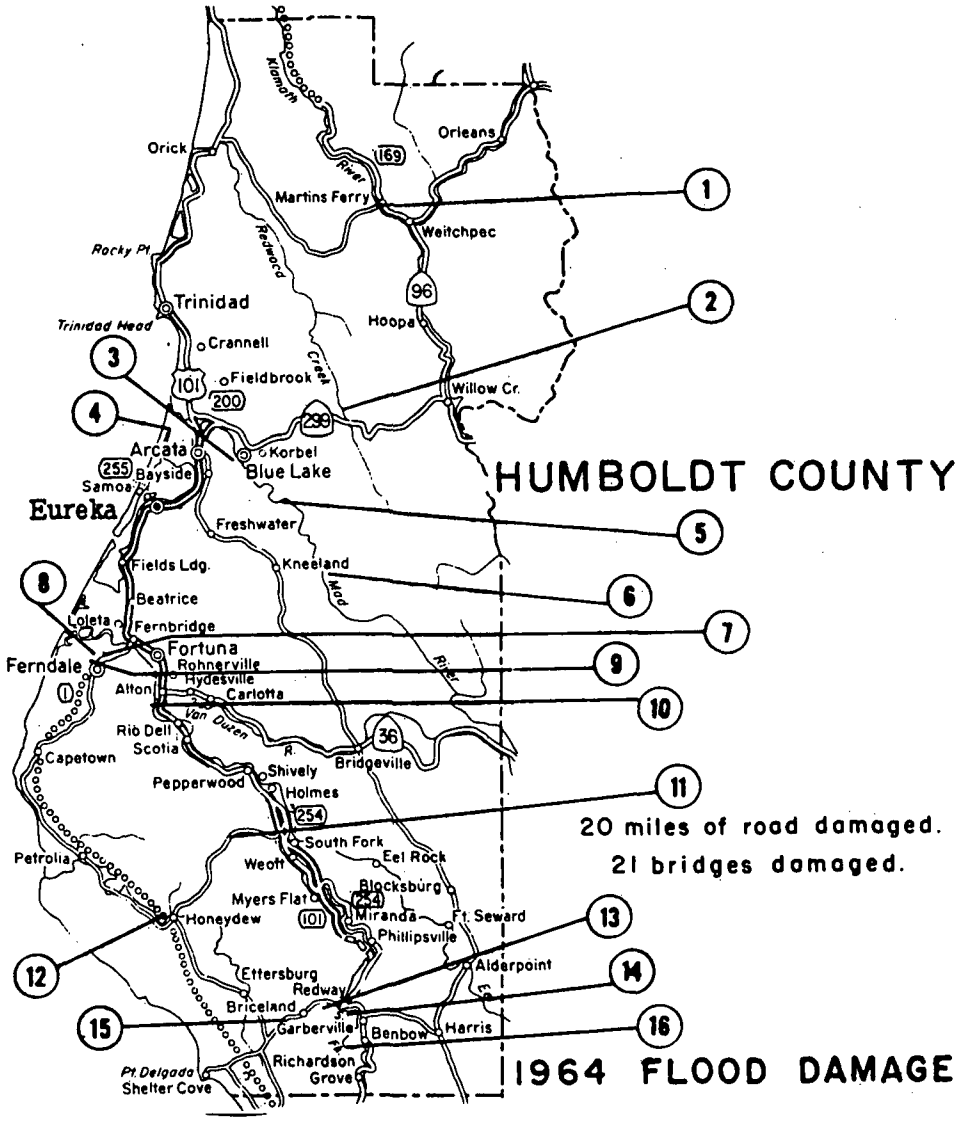
By the 15th of January the road east of Willow Creek was opened to all commercial vehicles. In daylight hours they were restricted to passage at 10 a.m., 12 noon, and 2:30 p.m. There were no restrictions at night.

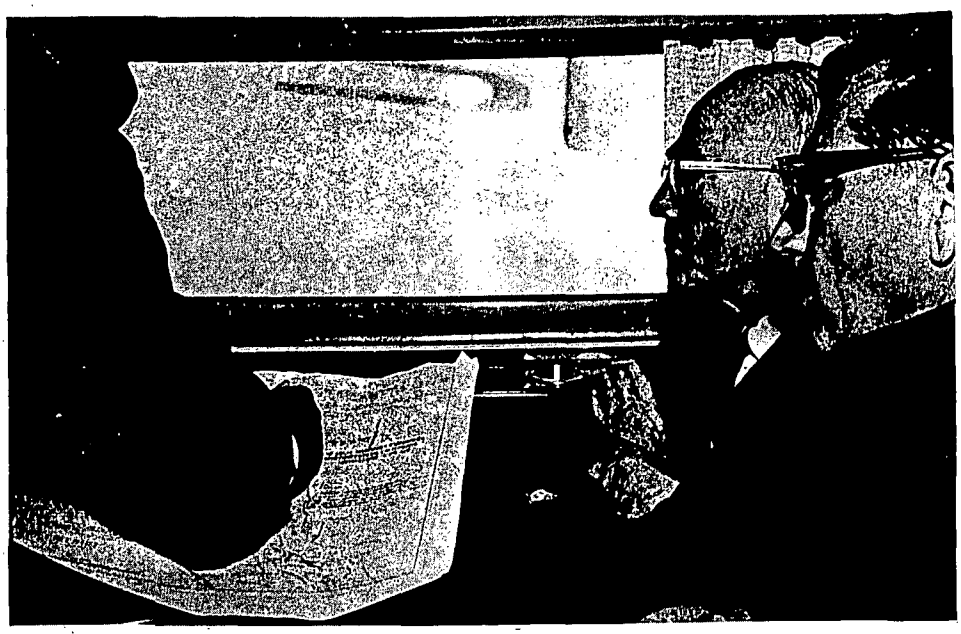
On January 19th the daily convoys were doubled, leaving Berry Summit at 9:30 and 2:30; westbound from Willow Creek at 10:30 and 3:30. Passenger cars and legal loads up to 40-foot maximum length vehicle were permitted. Route 299 east of Willow Creek was opened to all traffic, subject to normal construction delay.

In the meantime the road into Hoopa Valley had been improved to take any legal load and traffic was being allowed on the same three-times-daily schedule with no restrictions at night. The road was not recommended for passenger cars.

By the 24th of January Route 299 was taking all legal traffic in the scheduled convoys, and on February 2 the schedule was dropped, traffic being convoyed each way through construction areas 24 hours a day as necessary. The traffic count was up to around 250 vehicles daily each way by this time. On weekends there were no restrictions.

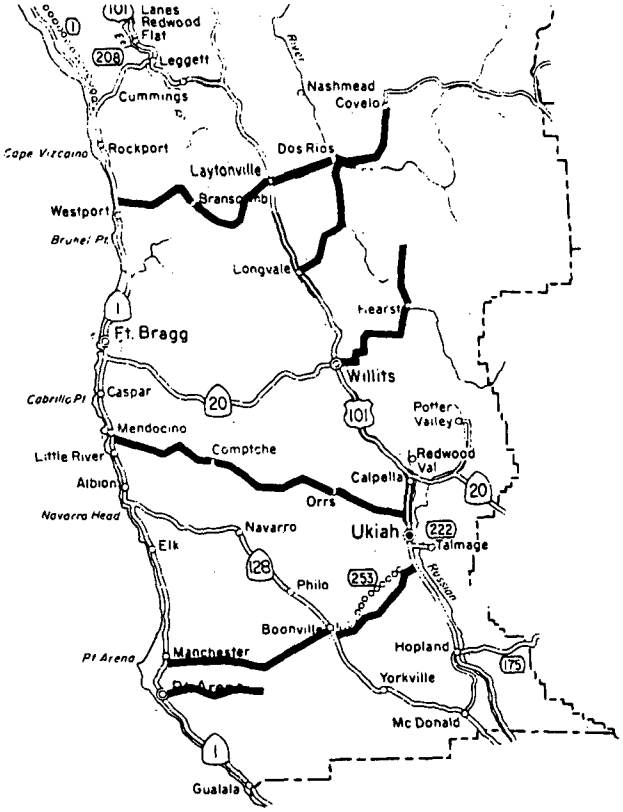
By early February both Route 299 and U.S. 101 were open to all traffic, but with convoy traffic still in effect up the Smith River Canyon on Route 199. This route was opened completely on February 14, leaving the Klamath Ferry the only interruption





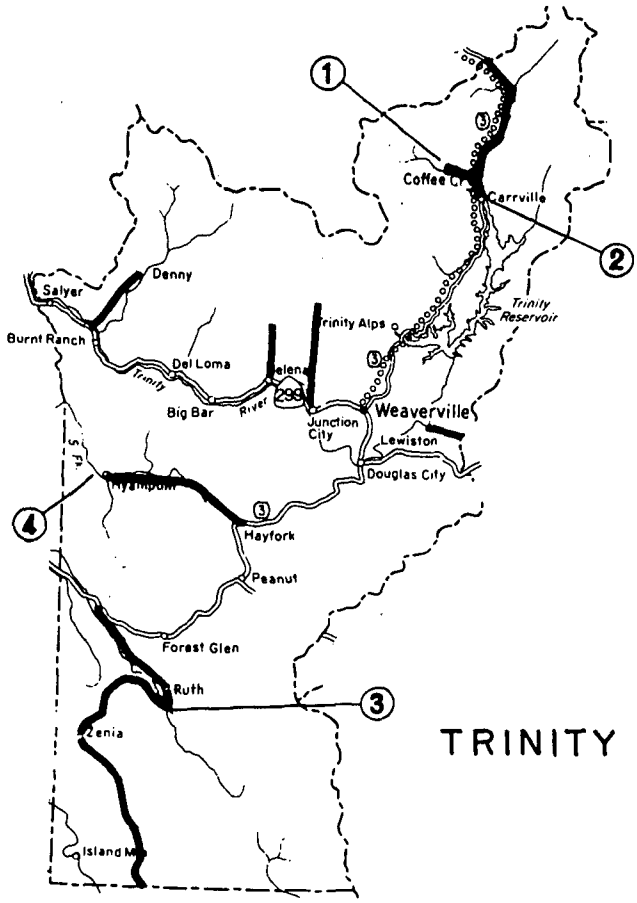
On inspection flight in January to Humboldt County in Governor's plane, Highway Commissioners Abraham Kofman (left) and William S. Whitehurst are briefed on the highway situation by State Maintenance Engineer Edward L. Tinney.

Lyman R. Gillis, assistant state highway engineer for Operations, en route to flood area in Governor's plane, is interviewed by Associated Press Reporter Robert Wood.



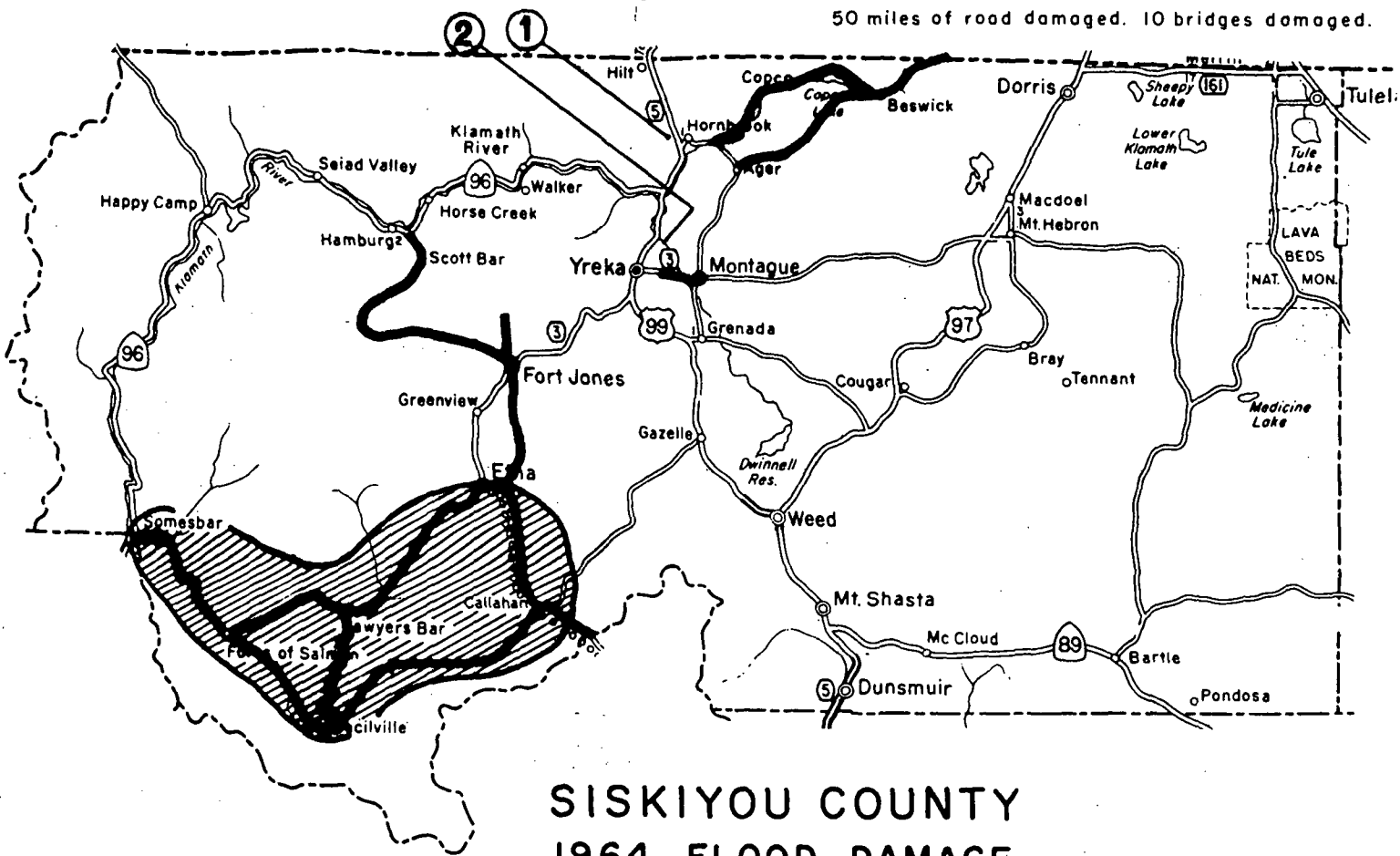
MENDOCINO COUNTY
1964 FLOOD DAMAGE

10 miles of road damaged. 14 bridges damaged



TRINITY COUNTY
1964 FLOOD DAMAGE

50 miles of road damaged. 10 bridges damaged.



SISKIYOU COUNTY
1964 FLOOD DAMAGE

60 miles of road damaged. 30 bridges damaged

in any of the main routes. The ferry was retired when repairs were completed on the Klamath River Bridge and its was reopened to traffic on March 14. Log bridges and use of a portion of a logging road had also made Sign Route 36 usable. Sign Route 96 still remained closed because of bridge destruction.

This was partly remedied by replacement of the washed out truss of the Somesbar Bridge with plate girders and reopening of the bridge on March 4. A low-level, temporary bridge was opened April 1 at Orleans, and then Route 96 could be traversed its entire length.

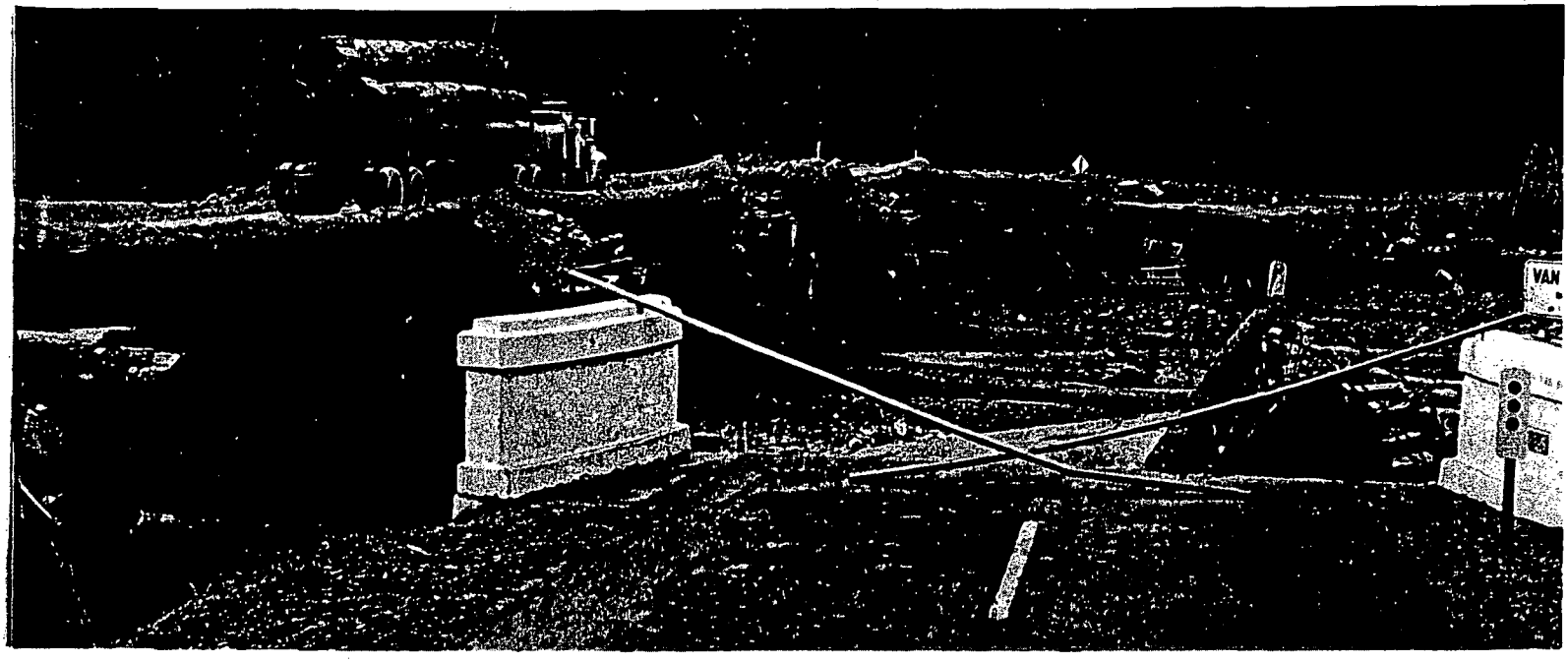
To achieve these repairs, nearly 50 emergency contracts were let, and an additional 180 personnel were hired on the District 1 staff. Also, more than 500 individual service contracts were let to put men and equipment to work on an hourly basis. Since District 1 suffered much the greater part of the damage, this was by far the highest number of emergency contracts in any district—the few negotiated by District 2 were mainly in connection with reopening Route 299, in their assistance to District 1.

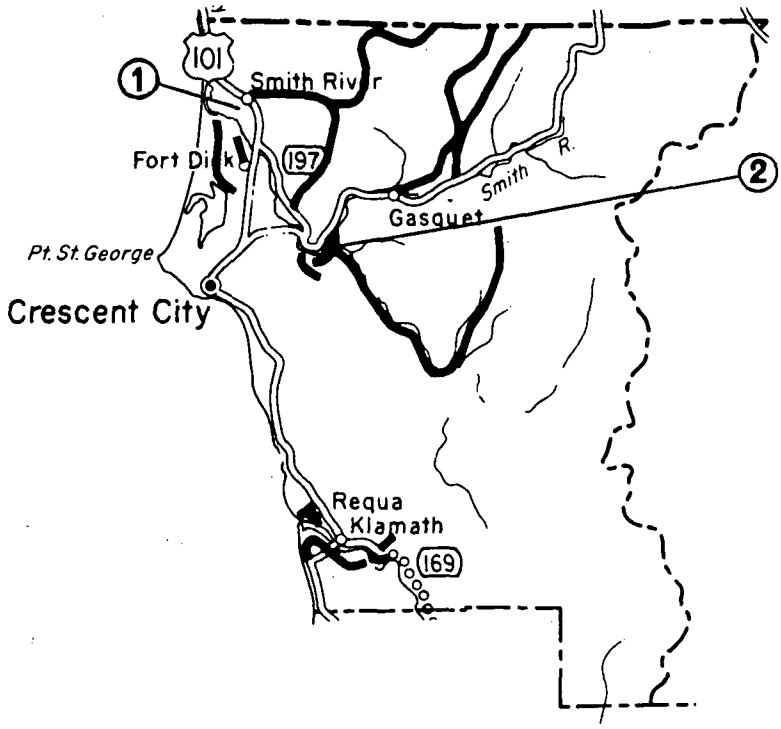
Bids were opened on construction of a new Redwood Creek bridge on Route 299 on new alignment March 10 and low bid was $568,648.

This is to be a 674-foot-long steel span 110 feet above the creek bed on

In foreground, left to right, Director of Public Works John Erreca and Highway Commissioners Abraham Kofman, Joseph C. Houghteling, and William S. Whitehurst look at gap in Redwood Highway north of Rio Dell.

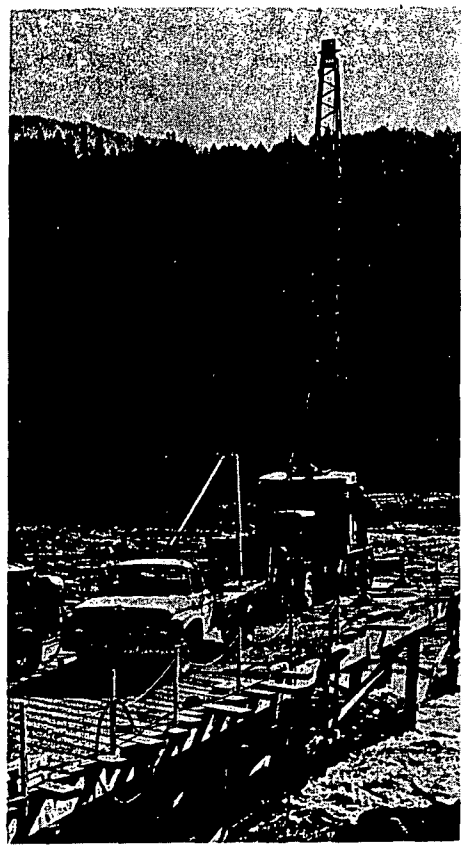
BELOW: Four-span log bridge, built as temporary replacement for destroyed bridge in foreground, is carrying legal loads on State Route 36 just west of Bridgeville. Piers are log cribs filled with rock and gravel. Sections are held together with steel cable.





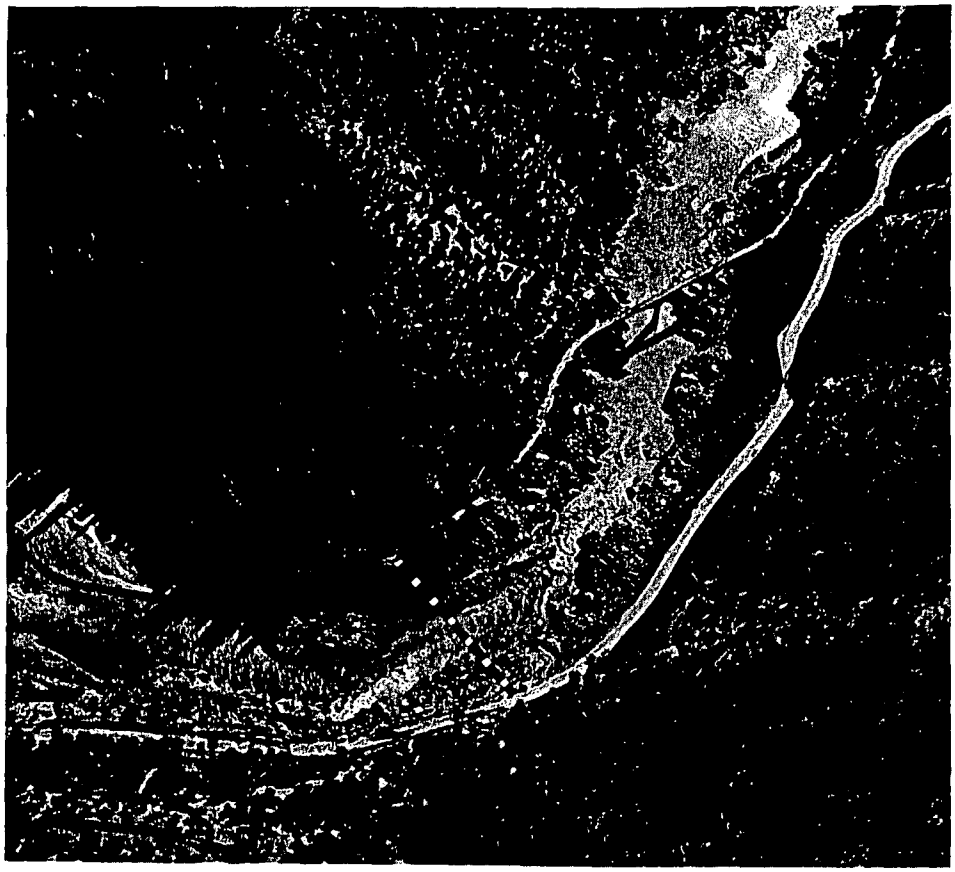
DEL NORTE COUNTY
1964 FLOOD DAMAGE

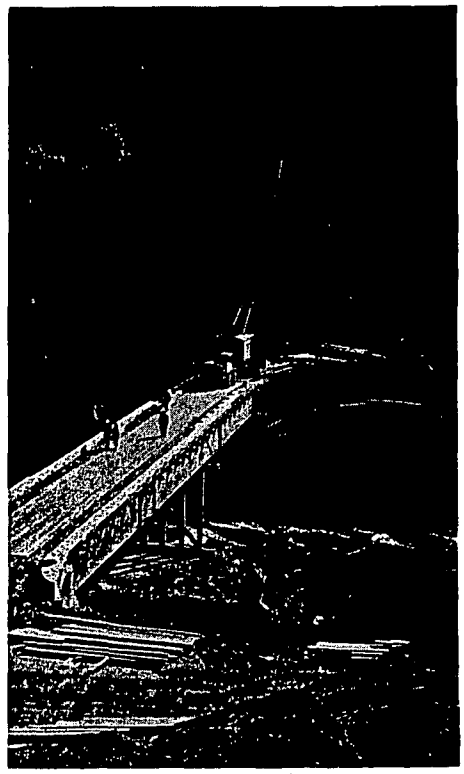
25 miles of road damaged. 5 bridges damaged.



ABOVE: First stages in construction of temporary crossing over Klamath River to replace washed-out Orleans suspension bridge. BELOW: Construction stage on replacement bridge at Somesbar. With abutments and pier intact, girders were quickly positioned to replace truss which stream carried away.

BELOW: Aerial photo of site of Highway 49 bridge across American River near Auburn. When structure, site of which is marked by dotted line, was carried away by wall of water resulting from Hell Hole Dam failure, detour road was built and emergency traffic was routed across old railroad bridge at upper right. New bridge was opened to traffic May 1, 1965.





four concrete piers. Attention was given in the design to have the bridge complement the natural beauty of its setting. A special rough-textured finish will be applied to the concrete surface of the tall piers.

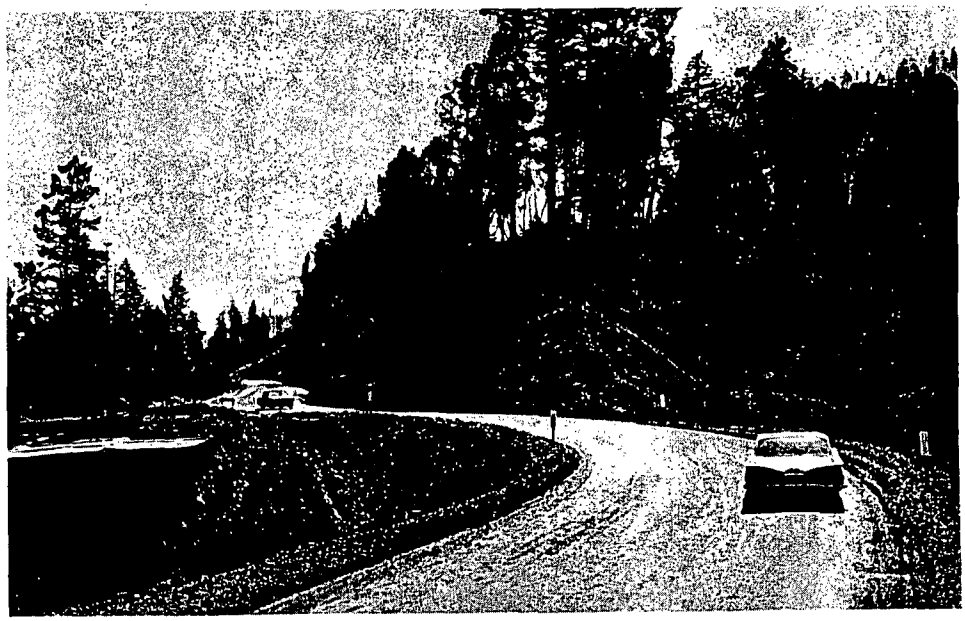
On March 24 the Highway Commission allocated $1,000,000 to step up construction of the highway relocation on both sides of the bridge. On March 29 bids were advertised for this work.

On March 24 bids were opened for construction of a new bridge on State Route 96 at Willow Creek, low bid $396,693.

The cost? State repairs when recalculated firmly after all information was in, were expected to be $35,000,000, somewhat higher than first estimates. County repairs, however, were somewhat less, slightly below $23,000,000 rather than the $28,000,000 first estimated.

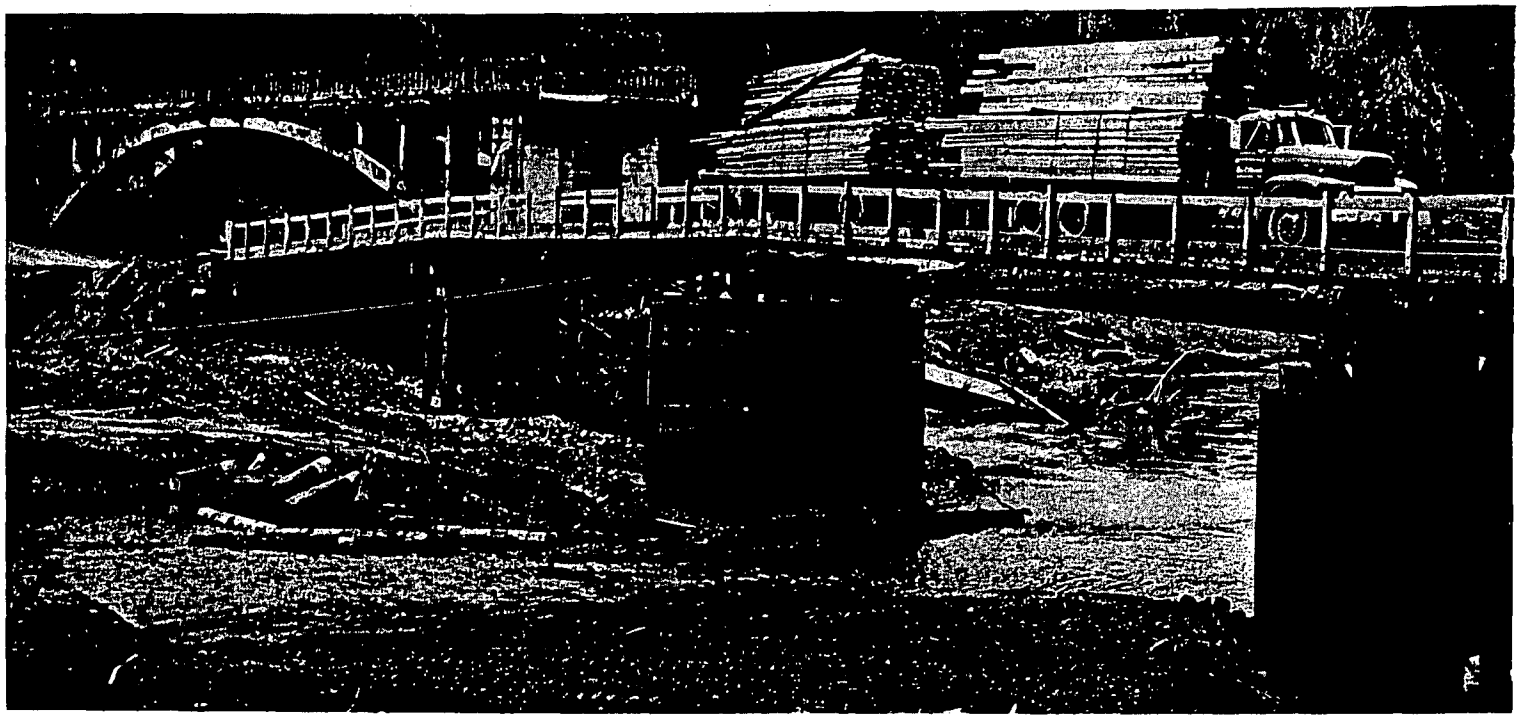
On March 31 both houses of the Legislature had passed and sent to the Governor for signature the Collier Bill, effective April 1, which provides for a 1-cent additional gasoline tax for nine months to collect the amount needed to defray the cost of repairs to flood damaged roads. The Governor signed it the same day. This will make the cost of the road damage about $5 for the average car owner in California.

Reconstructed Sign Route 36 in Van Duzen River Canyon. Height and extent of raw slopes indicate amount of undercutting by stream in flood.



ABOVE: Rebuilt section of Route 299 near Willow Creek, carrying normal traffic in March.

BELOW: Temporary log bridge on pilings on Sign Route 36 east of Carlotta, now carrying legal traffic loads. This is near Grizzly Creek Redwoods State Park.



Kudos Tell Story

By JOHN ROBINSON,
Information Officer

Nothing But Praise for Highway Workers

A great asset to the Division of Highways in repairing flood-damaged highways was the group of dedicated and experienced personnel in the field at the time. The tremendous effort and achievement of these workers who reopened the roads in northern California after the Christmas 1964 floods are indicated in some of the commendations issued later.

In a special memorandum to all District 1 personnel dated January 4, 1965, District Engineer Sam Helwer said in part:

"The organization and personnel of our own Division of Highways have not only responded to this emergency efficiently but also with characteristic devotion and efforts beyond the call of duty. Most of our people worked without rest, often under extremely hazardous conditions. Some of our people were dropped into isolated areas by small planes and helicopters, after which they covered many miles on foot through snow, hail, and flood in continuing bad weather in order to bring back reliable information on the extent of damage as well as recommendations for procedures on repair and restoration of facilities.

"As usual, the work of our maintenance and construction personnel has been outstanding in every way. Work has been carried on around the clock through Christmas, New Year's, and weekends, and will continue on this basis until this extreme emergency has passed. Some of our initial efforts may be nullified by additional storms that must be expected before spring; however, our efforts will continue undiminished.

"As district engineer, I am grateful to all of our people at every level who are working so hard to restore the highways so badly needed in this area. I am confident this will be done as soon as humanly possible. I am humble in the knowledge that our organization is filled with trained personnel who go to work automatically and efficiently when emergencies arise."

ASSEMBLY RESOLUTION

On February 18, 1965, the State Assembly adopted unanimously House Resolution No. 175 which included these statements:

"WHEREAS, The men of District 1 of the Division of Highways, under the direction of District Highway Engineer Sam Helwer, were faced with the awesome responsibility of maintaining the highways of the severely stricken portions of northern California during the floods of December 1964 and January 1965; and

"WHEREAS, These floods caused unprecedented damage and unfortunate loss of life; and

"WHEREAS, The loss of life and property would have been far greater except for the almost miraculous job of emergency highway repair and maintenance done by Mr. Helwer and his staff in order to keep the highways open to relief-bearing transportation; and

"WHEREAS, This exceptional job was above and beyond the call of duty and in the highest tradition of American heroism; now, therefore, be it

"*Resolved by the Assembly of the State of California,* That the members extend their highest and most heartfelt commendation to Sam Helwer and the staff of Division of Highways District 1 for their role in averting greater disaster, and express the hope that these men will continue their magnificient work; . . . "

At its February 24, 1965, meeting the California Highway Commission unanimously adopted a resolution containing these words:

"WHEREAS, Storms occurring during the latter part of December 1964 caused unprecedented floods in streams and rivers throughout northern California, resulting in tragic loss of life and heavy damage to private as well as public property, including State highways; and

"WHEREAS, Many state highway bridges were destroyed or damaged, and numerous sections of highway closed by slides and washouts, resulting in the isolation of many communities; and

"WHEREAS, The maintenance personnel, engineers and other employees of the Division of Highways of the Department of Public Works, in this grave situation, responded wholeheartedly and heroically to their duty, working long hours in adverse weather under extremely difficult and hazardous conditions;

"*Now, therefore, be it resolved by the California Highway Commission,* That it hereby expresses to these employees its sincere appreciation and admiration for their outstanding service to the people of California in this emergency, and its further commendation to them for the rapidity with which damaged state highways were reopened to public travel."

SENATE RESOLUTION

On March 2 the State Senate unanimously followed suit with Senate Resolution No. 87, which included these paragraphs:

"WHEREAS, The devastation caused by the storm resulted in the destruction or substantial impairment of all means of travel and other communication over vast areas, resulting in the total isolation of numerous communities; and

"WHEREAS, Any undue delay in the restoration of adequate means of travel throughout this vast area could have seriously aggravated the effects of this awesome disaster; and

"WHEREAS, In the true tradition of American heroism, all of the personnel of District I of the Division of Highways, under the most competent leadership of District Highway Engineer Sam Helwer, worked unceasingly during even the most violent period of the storm in a most gallant effort to maintain and to reopen the highways in this devastated area; and

"WHEREAS, These public-spirited state employees performed many actions above and beyond the call of duty in order to aid the citizens of the stricken communities in a number of other ways; and

Henry H. Pickrell, assistant maintenance engineer, District 2, Redding, who took charge of work opening Route 299 from the eastern end.

"WHEREAS, All of the personnel and facilities of the Division of Highways were promptly and efficiently mobilized in an all-out effort to reestablish the vital highway links into the affected area in an amazingly short period of time; and

"WHEREAS, The efforts of these state employees did much to alleviate the impact of the disaster, and did much to support the morale and confidence of the residents of the disaster area; now, therefore, be it

"*Resolved by the Senate of the State of California,* That the members warmly commend Sam Helwer and the staff of District I of the division for their magnificent work in averting greater disaster; . . ."

Although Division of Highways personnel at District Headquarters and in Sacramento spent long hours both in the field and in offices planning and coordinating the reconstruction efforts, the brunt of the work fell upon the men at the scene.

Without exception all highway personnel in the flood areas unstintingly gave of their time and energy, but the following examples of the work done by some of the maintenance personnel will serve to clearly illustrate the caliber of these men and their work:

Samuel A. McCush of Piercy, Retired

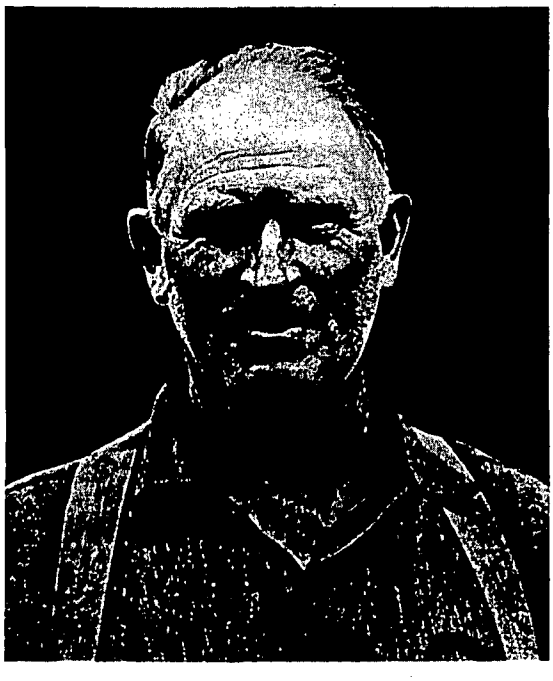
A random selection from the personnel files shows that as far back as

Sam Helwer, district engineer of District 1, Eureka, reports on the highway situation to local citizens and members of the Highway Commission at special meeting in January at Scotia Inn, Humboldt County.

December 1928 Samuel McCush, highway foreman, was recommended for a raise of $5 per month in salary because he was "an excellent foreman, thoroughly conversant with all phases of highway construction, including powder, bridges and oil . . . An excellent shovel foreman and above average as an organizer. He is a leader among his men and is respected by his men and the public who know him."

Sam was retired in 1954 and, when the Christmas floods of 1964 struck, had been peacefully ranching in the Piercy vicinity for 10 years. He was then 78 years of age. Nevertheless, horrified at the state the highway was in after the flood receded, he organized men and equipment and, for the several weeks the Piercy area was isolated, labored long hours seven days a week to effect repairs. Because of his retired status, he could not expect pay for his work, and when this was pointed out to him later, he just said, "I wanted to get the road open."

Samuel McCush of Piercy, highway foreman emeritus, retired in 1954 at age of 68, organized crews and worked for 12 days without pay on the Redwood Highway to "get the road open."



In a personal "thank you" letter, J. C. Womack on February 5, 1965 commended Sam for the "excellent work you did on your own initiative during the flood which began on December 21, 1964."

Mr. Womack further said, "Your immediate and intelligent action in obtaining a small crew of men and equipment in connection with removing trees, opening culverts, and other emergency work in the vicinity of Piercy, on US Highway 101, has saved the state, according to Mr. Sam Burrows, Highway Superintendent in Garberville, between $150,000 and $200,000. Your action in this emergency is another fine example of the esprit de corps that has prevailed in the Maintenance Department for years."

Henry H. Pickrell, Assistant Highway Maintenance Engineer, Redding

With several miles of US Highway 299 completely destroyed west of Willow Creek, preventing men and equipment from Eureka getting through to make repairs, Henry Pickrell, of the District 2 office in Redding, at the request of District 1 in Eureka, took charge of operations, and working around the clock, reopened the 49 miles of US 299 east of Willow Creek.

The work included the clearance of numerous slides, filling of many washouts, and construction of three bridges adequate for legal loads. The road was opened for emergency traffic after a total elapsed time of eight days and nine hours, allowing the evacuation of sick and injured people, and the importation of badly needed food and medical supplies. During the entire operation, the workers were harassed by continuous rain and snow.

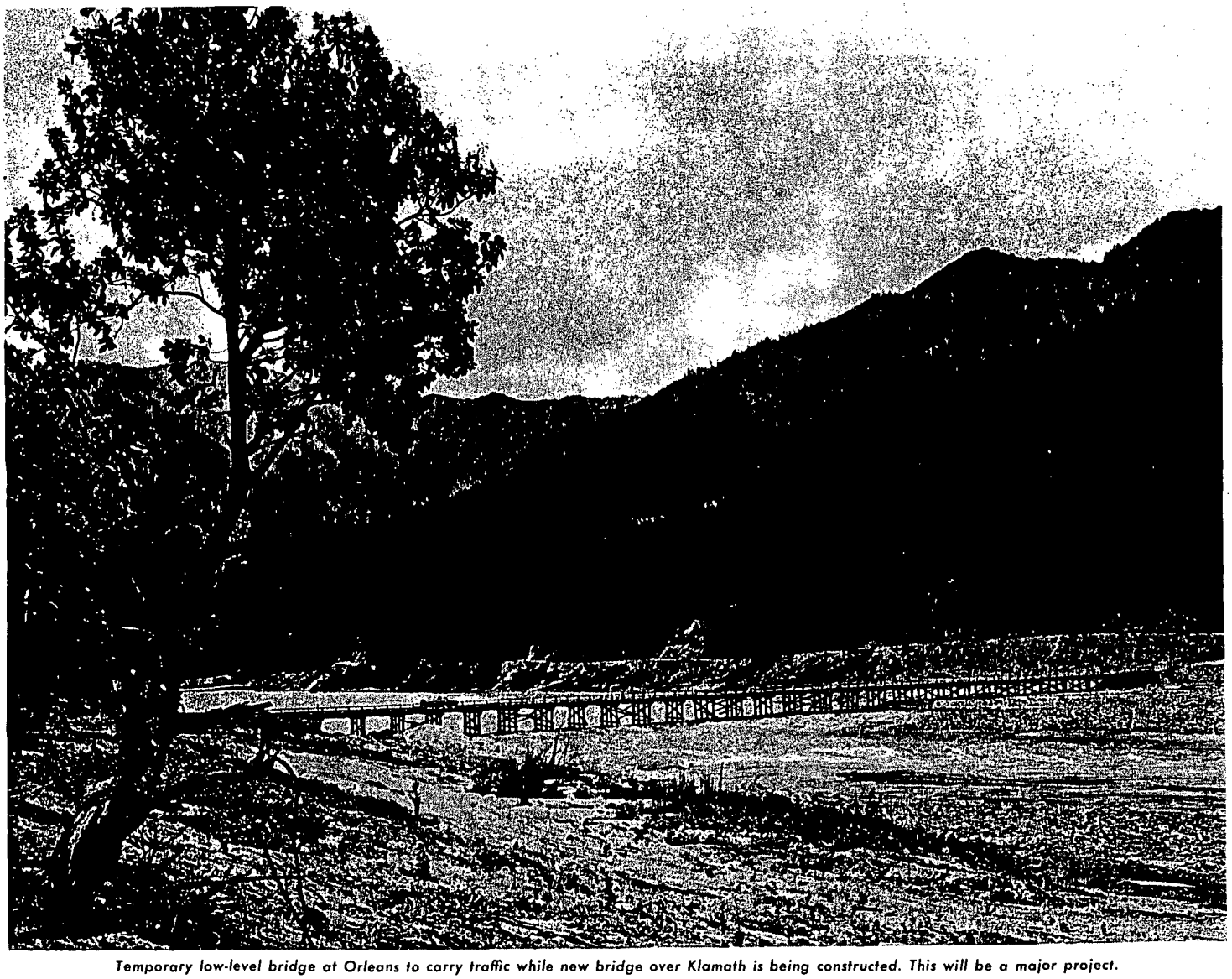
When the special congressional subcommittee visiting the devastated area commended Mr. Pickrell for his efforts, Mr. Pickrell replied "My boss, Mr. Wilson, told me to get out there and open the road. So we opened the road."

Russell Beckwith, Highway Superintendent, State Honor Camp 41, Siskiyou County

When the bridge at Clear Creek was destroyed by flood waters, Beckwith organized his personnel and materials and in four days reopened the road to Happy Camp so that his personnel might be of assistance to the town during the emergency. To do so included construction of a two-span log bridge with one 99-foot span. Beckwith was commended by the district maintenance engineer for his work.

On January 18th, when this same Honor Camp 41 group was building a log bridge at Dillon Creek, Highway Foreman Bud Sheffield was knocked off the structure by a rolling log, and fell 32 feet into the creek. Injured and unconscious, he was being carried downstream by the swift current when James S. Havard, followed immediately by Jack Lee Parvin, dove into the water to rescue him. Since Sheffield is 6'5" tall and weighs about 245, the rescuers were having trouble getting him ashore, so Elmer B. Rhoades and Wayne G. Cassen also entered the stream and helped bring the unconscious man ashore. Sheffield was hospitalized with a cracked pelvic bone and mild concussion, and is presently convalescing. All four honor camp members were commended in writing by the camp supervisor, and by the State Highway Engineer in a letter of appreciation to the Director, Department of Corrections.

Mentioned in the previous issue were those highway employees who saved the bridge at Dyerville, and who discovered the washout on Interstate 5 at Meers Creek. These are only a few examples of the dedication, ingenuity and even heroism with which highway people responded to the emergency. The entire catalogue would fill many issues of this publication.



Temporary low-level bridge at Orleans to carry traffic while new bridge over Klamath is being constructed. This will be a major project.

Northwest Roads

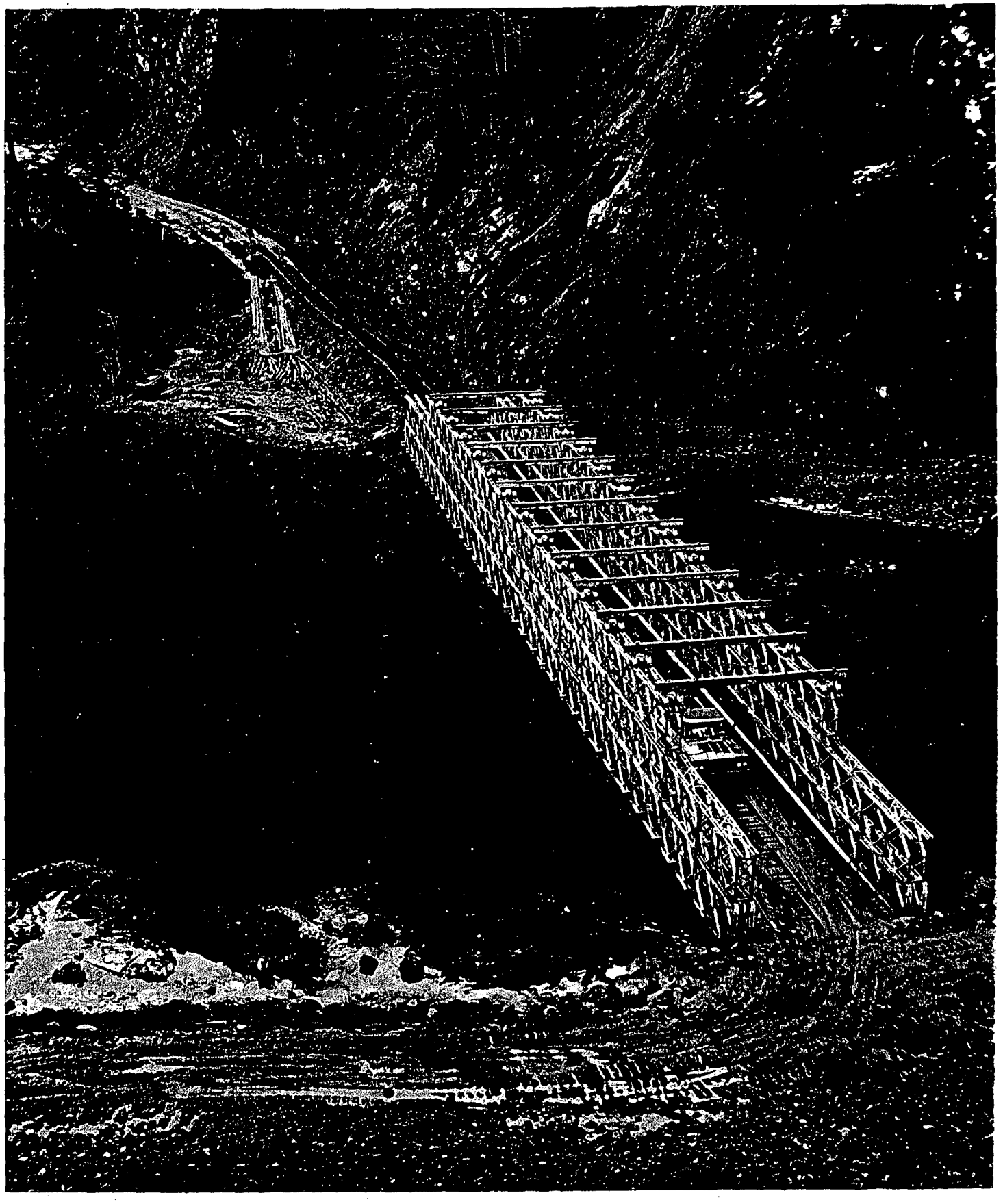
Back to Normal — Almost

By JOHN ROBINSON,
Information Officer

At noon on May 12, 1965, the last detour on storm-damaged northwest state highways was eliminated when, with appropriate ceremony, the Robinson Ferry Bridge, which carries US 101 over the lower Eel River, was reopened. This crossing, also known as the Paul E. Mudgett Memorial Bridge, suffered the loss of more than 600 feet of its structure in the December 1964 floods, and was made famous throughout the United States by Neil Hulbert of the *Humboldt Times*, in his widely reprinted aerial photo which showed the broken spans with the floodwaters rushing through the gap.

Present at the reopening ceremonies were mayors of several Humboldt County towns, the chairman of the county board of supervisors, the president of the Redwood Empire Association, and various other dignitaries. It was an important occasion to these northwest residents, because it assured them their timber products would flow more smoothly to market, and that the tourists so important to their economy would be able to travel through the redwood country the same as they had in previous years.

Reopening of the bridge eliminated use of Humboldt County's Blue Slide Road as a detour. This is a section of county road which follows along the south side of the Eel and rejoins US 101 at Fernbridge. Although very little longer in miles, the detour road was designed neither for high speed nor heavy traffic loads, and its retirement from heavy duty represents considerable saving in time.



The Bailey Bridge at Grey Creek photographed on January 7, 1965, when it was already a major factor in movement of convoy traffic on Route 299 between Redding and Eureka.

Prior to the completion of the bridge repair project, that section of freeway in the Fortuna-Alton area damaged by the flood had already been repaired.

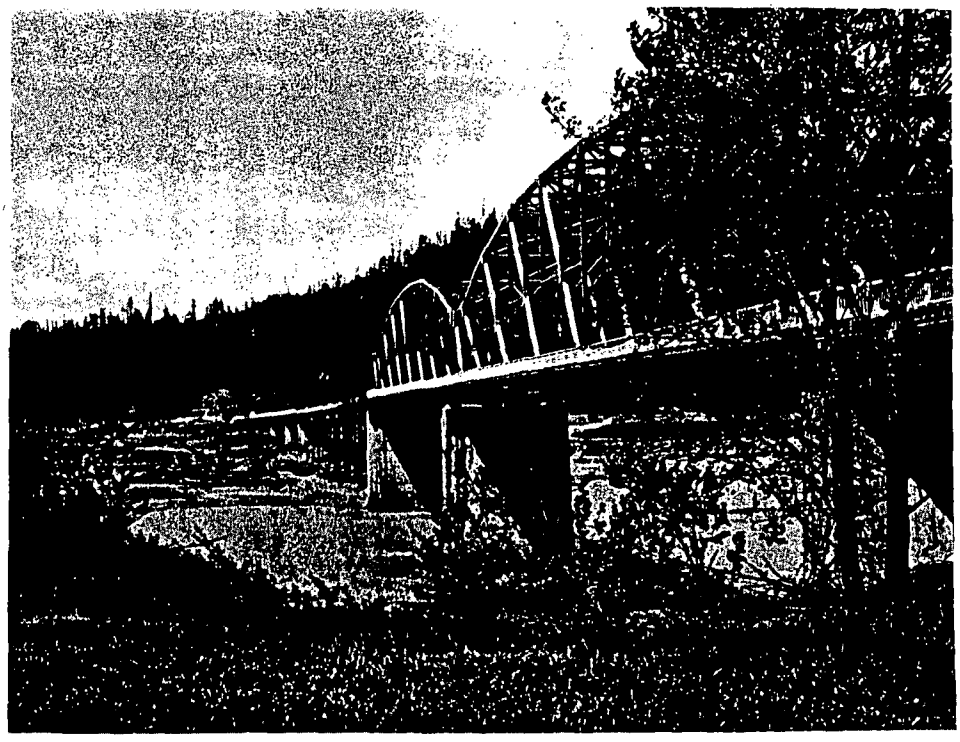
US 101 and US 199 (the Redwood Highway), and US 299 which crosses the mountains from Eureka to Redding and the Sacramento Valley, have now been resurfaced and striped for their entire lengths. On the Redwood Highway travelers may experience short delays until approximately August 15 along the Eel River just south of Pepperwood, where a major repair contract is in progress, and there will be signal-controlled one-way traffic across the Scotia-Rio Dell Bridge until completion of repairs there in August.

A temporary low level bridge is in use on Route 96 at Orleans, to replace the structure destroyed by the Klamath River. Traffic can now move over this route freely, although it will be some months before all the damaged sections on this route are completely back to normal.

Since so many of the road fills and bridges were temporary, any substantial rises in the river levels would have been disastrous, undoing the work of weeks, but nature was cooperative. There were no heavy rains of sustained duration during the spring, and although there were occasional rises in the rivers, the temporary installations have not been damaged. During the summer months most of these temporary repairs will be consolidated or replaced by permanent structures.

Repairs have been made or contracts have been let for permanent bridge repair or replacements in all cases of bridge destruction by the 1964 floods, except the Orleans crossing, which is under study. When design is completed, it is to be 14 feet higher than the previous bridge, but construction cannot be completed until some time in 1966. The other permanent bridges now under construction on the Van Duzen and Smith Rivers have urgency provisions in their contracts requiring their completion by December 1, 1965.

Due to the additional funds released by the temporary gasoline tax provisions, new construction also can go forward on the Redwood Highway. A contract was let in June for a multimillion-dollar project extending the Redwood Freeway northward seven miles to a few miles south of Scotia. The old route will be retained for tourist travel as has been done in the past in creating the Avenue of the Giants.



Looking north from Rio Dell side of Eel River, along repaired Robinson's Ferry Bridge, reopened in mid-May.

View along Route 96 which follows the Trinity-Klamath system. This popular sportsman's route is passable, but requires care in places.

Δ47743—500 6-65 5M

printed in CALIFORNIA OFFICE OF STATE PRINTING