

Counting the Winter of '82 Losses

By Robert Bartlett
and Gary Swan

As Northern California slowly recovers from the most destructive winter in recorded history, the awesome dimensions of the damage, death and economic loss wrought by the storms are just beginning to emerge.

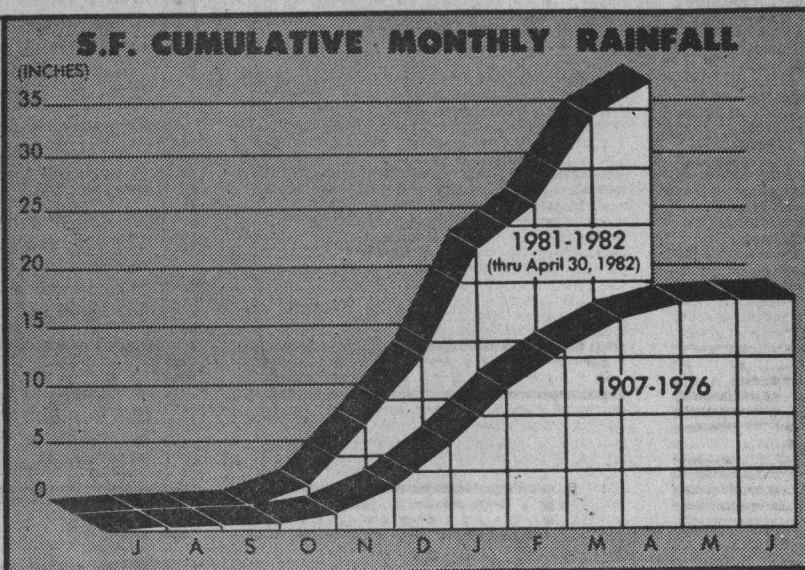
The job of compiling a statistical portrait of the human and property devastation is so staggering that the full extent of the losses will never be known.

However, battered counties throughout Northern California are now closing their books on the winter of 1981-82, and even the incomplete statistics are far worse than anticipated:

- At least 51 people were killed and 481 others injured.
- More than 7500 people were left homeless by floods, mudslides, massive snowdrifts and avalanches.
- More than 8000 homes and 1000 businesses were damaged or destroyed.
- Ten counties were so hard-hit they were declared federal disaster areas.
- Damage costs throughout Northern California, with many areas yet to report, already are in excess of \$635 million.

The enormous economic after-effects of the the region's wettest winter of the 20th century are expected to be felt for years, especially in California's fertile farmlands.

Losses to California's \$14 billion agricultural industry, by most yardsticks the state's biggest business, are estimated at nearly \$225



These two graphs of San Francisco rainfall show why this was no ordinary winter

million so far, and may go higher.

According to the state Department of Food and Agriculture, damage was most widespread in the fertile farmlands of the northern San Joaquin and Sacramento river valleys. Further south, a single hailstorm on March 28 cost Fresno County farmers \$122.2 million in lost crops, according to the county agricultural department.

Throughout Northern California, water remained standing so long in the fields that experts fear the roots of a wide variety of orchard species — peaches, pears, plums, apricots, almonds and walnuts, among others — may rot, forcing farmers to go out of business or replant. Even then, the new trees would take several years to reach productive maturity.

The late rainfall also prevented planting of an entire strawberry crop, delayed field preparation for California's rice and tomatoes — together, these two crops grossed

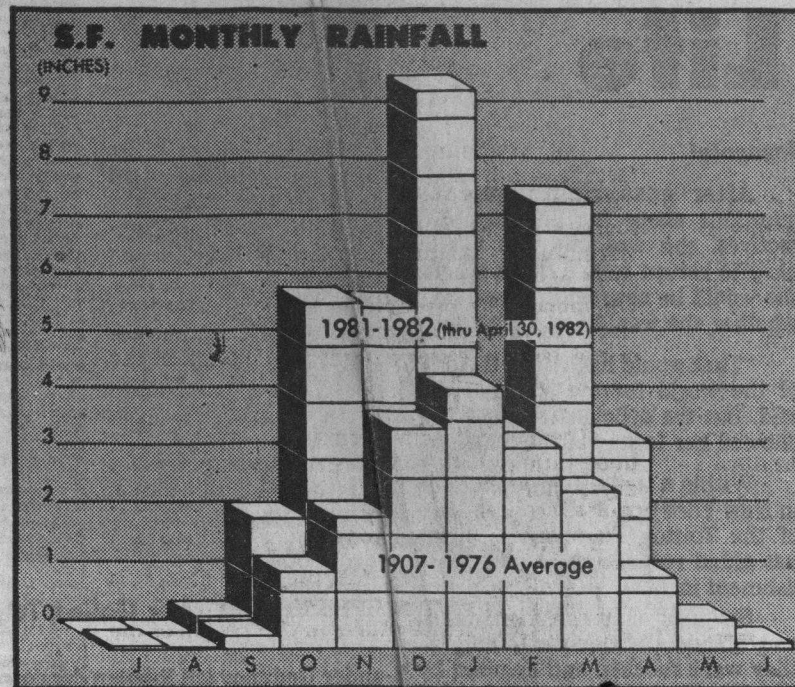
nearly \$650 million last year — and drowned much of the state's \$52 million asparagus crop, said Dan Halvorsen, a statistician for the state Department of Agriculture.

Public health officials say the standing water also is expected to produce the worst mosquito infestation since the mid-1960s, with the possibility of an outbreak of encephalitis, the so-called "sleeping sickness."

Forestry officials are raising a few specters of their own, including increased fire dangers as an indirect result of the storms.

The state and the federal government's nearly 88,000 square miles of California forest and brushlands are always summer fire risks, said Jim Dykes, a fire control officer for the Department of Forestry in Sacramento.

But because of this winter's tremendous amounts of rain and snow, he said, the state expects a bumper crop of underbrush that by mid-August, should be bone-dry, perfect fuel. Depending on the weather, between 25,600 and 32,000 tons of weeds and underbrush



January 45 storm would be so severe (6.6 inches in San Francisco in 24 hours) and that along much of the coast it would become a once-in-500-year event, according to weather experts Chris Phanartzis, of San Francisco's Clean Water Program, and Bill Arvola, a senior meteorologist with California's Department

of Water Resources.

Though less severe, three other storms were similar to early January's record-breaker: one just before Thanksgiving; another in the middle of February, and the late storm during the first week of April.

There were plenty of other

record-breakers: Colder, drier storms spawned in the Gulf of Alaska that left a swath of snow on low-lying coastal mountains and even the valleys. Ukiah, in Mendocino County, hadn't seen snow since 1975. It snowed five times there this winter.

But it was the wet, windy storms cranked out of an area of the Pacific between Hawaii and the California coast — a weather trough much closer to the coast than usual — that gave the winter its killer credentials.

These storms came in at an angle that allowed the hills and mountains along the coast of central California to wring the heavy moisture out of them. Kentfield, the posh community that usually has among the highest rainfalls in the Bay Area because of its position on the lower eastern slope of Mt. Tamalpais, recorded an astonishing 88 inches of rain this year, about the norm for a tropical island.

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"We're going to be in for a rough summer if past experience is any indication," Dykes said.

Although record-shattering rains and snowfall brought death and destruction to the land, the sea and the mountains from November through April, the worst storm took place on January 4 and 5.

During that deluge, five people died in Marin County, four in San Mateo County and 22 in Santa Cruz County—including 10 buried alive when much of a 1400-foot mountain collapsed into Love Creek, a mudslide so vast it would cover eight city blocks.

The Weather Service knew two days in advance that the system sweeping toward the Bay Area in the first days of January was a major one. The problem, according to John Monteverde, a professor at San Francisco State University who specializes in climatology, comes in differentiating between a large storm carrying four inches of rain, and a huge storm carrying 24 inches.

No one could predict that the

Storms' Damage Was Worse Than Expected

From Page 4

88 inches of rain this year, about the norm for a tropical island.

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In the Sierra, the storms produced massive amounts of snow and left an unprecedented late season snowpack — 17 feet at Donner Summit as of April 10, the deepest since record-keeping began there 80 years ago.

In the mountains and on the sea, the winter took its toll in human life. On March 31, an avalanche roared through the Alpine Meadows

unheard of, phenomena — from declining sun spots to Mount St. Helens to worldwide air pollution to the beginning of a new ice age.

The high-altitude jet stream of air came farther south and stayed south longer than customary, said the Department of Water Resource's Arvola. It captured the moisture from warm weather disturbances in the Pacific and, instead of sending the those storms north over British Columbia, they often came shooting "dead on track" to the California coast — and, in the case of the January 4 storm, right into the lap of the Bay Area.

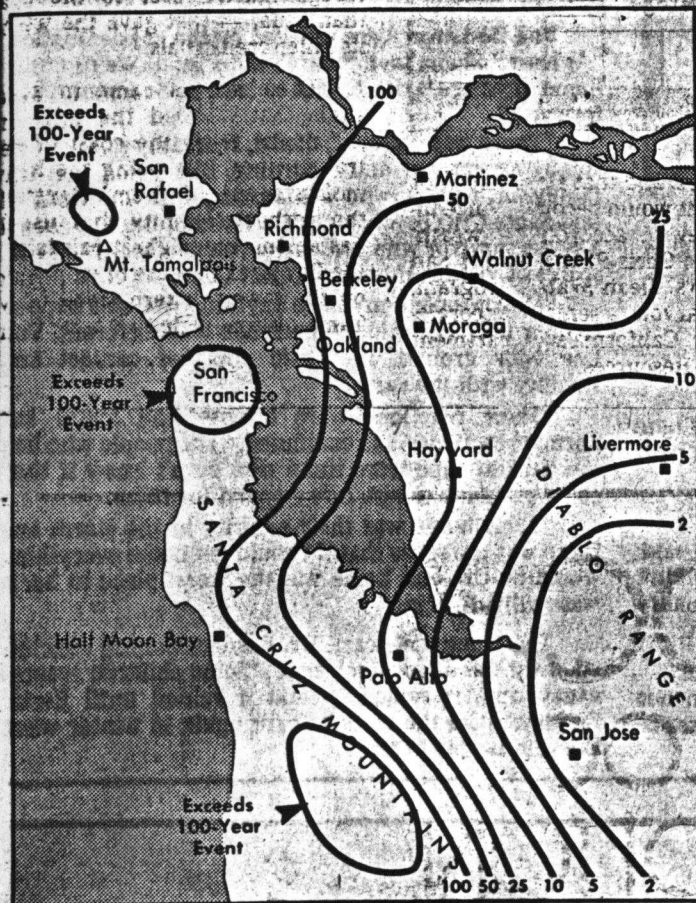
These wet, warm storms cut a path in the upper atmosphere that was followed by colder, dryer storms spawned in the Gulf of Alaska. These left a swath of snow on low-lying coastal mountains and even the valleys.

Last fall, weather observers learned that both water and air temperatures in that region of the Pacific Ocean, where most of Northern California's winter storms originate, were cooler than normal. Some experts believe this caused the severe winter, although meteorologists debate the cause and effect of ocean-atmosphere temperatures like farmers bickering about the primacy of the chicken or the egg.

No one really knows the cause of so vast a phenomenon as the weather, according to Gale Goudeau, a meteorologist at the National Weather Service's Redwood City office.

For whatever reason, in the months that followed, the Pacific Ocean spawned last winter's record series of storms between Hawaii and California.

Forecasters concede there's no way to predict Northern California's rainfall on a seasonal basis. "Variability is (expected) in a Mediterranean climate," said San Francisco State University's Monteverdi. "If you have six years (of rain or drought) in a row, there may be some concern. One means nothing."



The map is divided according to how many years should come between storms that drop as much rainfall as fell in the big January downpour

ski resort at Lake Tahoe; seven died. On April 10, six Bay Area amateur sailors were drowned during an unexpected storm that churned up San Francisco Bay and the ocean off Northern California.

There were about a dozen intense storms, some isolated and harmless fronts and other multiples or waves of fronts that struck one upon the tail of another.

They behaved like the mischievous children of a large family — alike in looks and temperament but with individual idiosyncracies all but impossible to predict.

The first hint of winter was the pervasive chill over the North Pacific last fall. Vast areas of cloudiness stretched from the North Pole down to the spawning area for storms between Hawaii and California.

Theories abound for this unusual, but not

This winter's record rain came only five years after two drought winters in 1975-76 and 1976-77. And the two drought years followed two wet winters. It is unusual, in fact, when rainfall or snow depths reach a statistical norm anywhere in Northern California.

"California had seven years of below normal rainfall in the 1930s, the time of the Dust Bowl," Monteverdi added. "But that was no climatic change."

The wet winter did provide a few pluses. Late last month the Department of Water Resources predicted that runoffs from the 12 major river systems tapped by most of California's cities and farms would range from 57 to 90 percent above normal, filling every major reservoir to the brim.

Northern Californians are already enjoying one major benefit: Pacific Gas and Electric Co. recently began to pass along approximately \$1 billion in savings it will realize, through higher hydroelectric production in the form of cheaper electricity, to 3.2 million power customers from Bakersfield to the Oregon border.

Early Snows

Alaskan Front

Hurricane Winds

Wind and Rain

Rain, Rain

The Deluge

Bay Area Snow

More Mudslides

Rain, Rain

Rain and Frost

Hail and Avalanches

Spring Downpour

OCTOBER

OCTOBER 10-11

- Unseasonably cold storm drenches Northern California
- First snows hit Sierra above 6000 feet
- Seven inches of snow recorded at Donner Summit
- Mountain passes close unusually early

OCTOBER 28

- More than half-inch of rain drenches San Francisco
- As much as two feet of snow buries the Sierra
- Power outage hits one-third of homes in Ukiah
- Much of Central Valley awash in heavy rain

NOVEMBER

NOVEMBER 13-16

- Hurricane-force winds batter North Coast
- Traffic paralyzed in Shasta, Siskiyou and Trinity
- More than five inches of rain in Redding
- Day-long power outage paralyzes Fort Bragg
- Roads closed in Modoc, Lassen and Plumas counties
- Flood damages 20 homes in Shasta County
- 90-mph winds on Mt. Tamalpais in Marin County

DECEMBER

DECEMBER 19-20

- Flooding hits parts of Marin County, Russian River
- Slides close highways near Lake Tahoe, Leggett, Eureka
- Bridge over Mad River in Humboldt County washed away
- Floods close roads in Mendocino, El Dorado counties

DECEMBER 31-JANUARY 1

- Snow on hills in San Francisco, Oakland and Berkeley
- Hail in Crescent City, Shelter Cove and Eureka
- 60-mph winds and snow hit Siskiyou and the Sierra
- Washout delays Amtrak's Coast Daylight passenger train
- Snow closes highways in four counties

JANUARY

JANUARY 4-5

- Love Creek mudslide kills 22 in Santa Cruz County
- Eight die in Marin, San Mateo counties
- Marin slide partially blocks Golden Gate Bridge
- San Francisco gets 6.6 inches of rain in 24 hours
- Snow closes Highways 50 and 80 over the Sierra
- Storm isolates Pescadero, Bodega Bay and Inverness
- Five counties declared disaster areas
- Storm forces evacuation of thousands in Bay Area

FEBRUARY

JANUARY 19-20

- A foot of snow hits Mt. Hamilton near San Jose
- Heavy snow on hills of San Mateo, Santa Cruz counties
- Most schools in Mendocino County closed by weather
- Chains required on all roads in far-northern California

FEBRUARY 13-16

- Poison oak infestations spread by flood waters
- Slide reduces Highway 101 above Willits to one lane
- Russian River flood closes Highway 175
- Highway 36 in Tehama County closed for 12 hours
- Mudslides in San Mateo County

MARCH

FEBRUARY 27-MARCH 1

- Heavy rains from San Francisco to Eureka
- High winds batter Central Valley
- Strong winds, rain hit Redding

MARCH 16-18

- San Joaquin Valley hit by freeze
- Snow on Mt. Tamalpais and Mt. Hamilton
- Hail and thunderstorms hit Sacramento area
- High winds sweep much of Northern California

APRIL

MARCH 28-31

- Avalanche kills seven at Alpine Meadows ski resort
- Hail causes millions in farm damage in central valley
- Highway 80 over Sierra partially closed for three days
- More than 500 San Jose trailer park residents evacuated
- Highway 44 in Shasta, Lassen Counties closed by snow
- Slide reduces Highway 101 to single lane at Leggett
- Zero visibility closes roads in Tehama, Plumas counties

APRIL 9-10

- Pacific storm drowns seven amateur sailors in Bay Area
- Slide closes Highway 49 in Sierra County for five days
- Flash floods hit Yosemite
- Coastal areas get up to three inches of rain
- Highway 50 eastbound over Sierra closed seven hours