



HAWAII REGIONAL SEDIMENT MANAGEMENT: SUNSET BEACH WORKSHOP 18 SEP 2015

**Patrick Caldwell
NOAA
National Centers for Environmental Information**

Waimea Bay, December 7, 2009, photo snappingpics.com

Talk Outline

- ★ [★] North Shore Surf
Climatology
- ★ High Run-up Events



Climatology: Historic Surf Observations

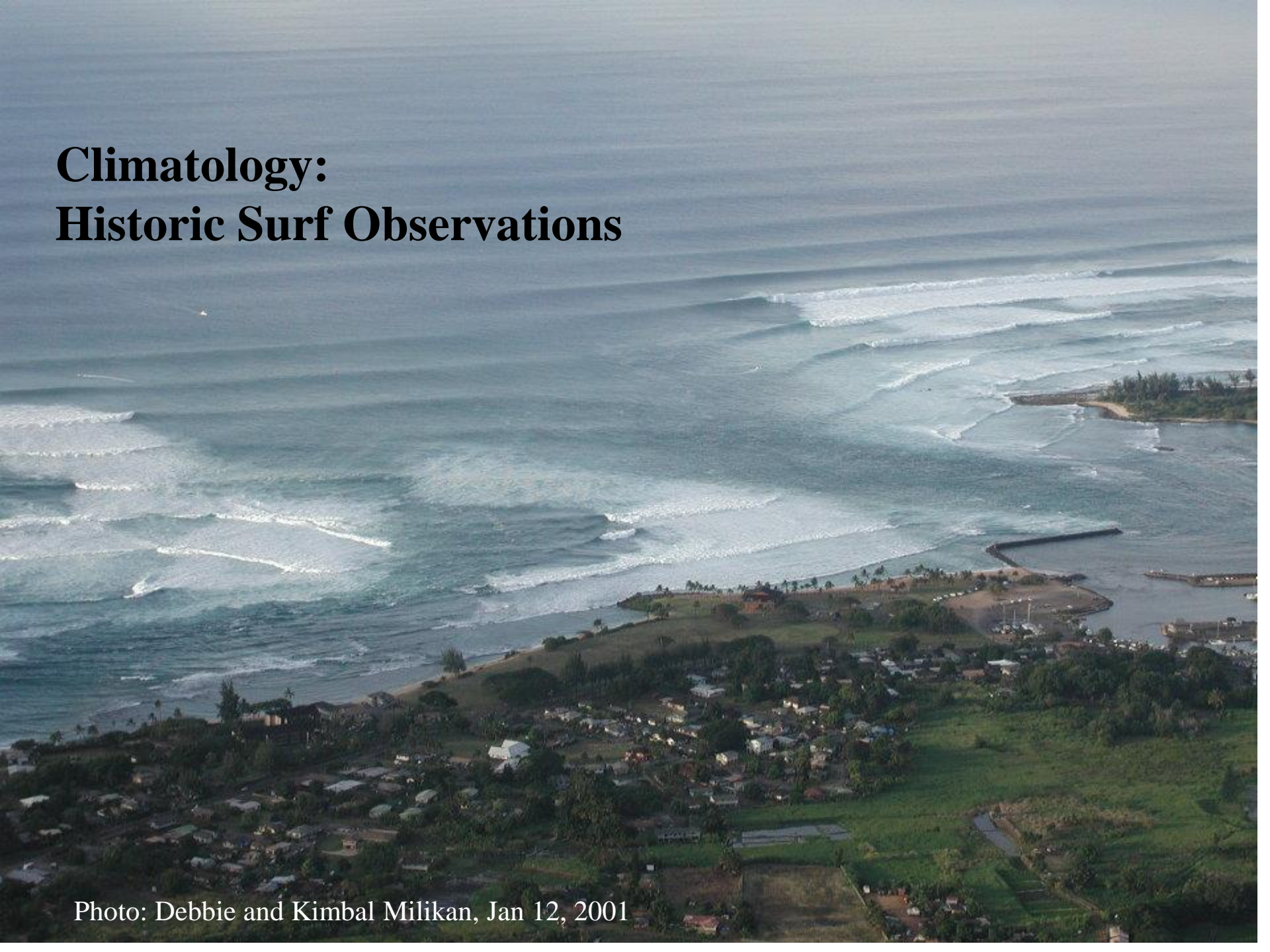


Photo: Debbie and Kimbal Milikan, Jan 12, 2001

Visual Surf Observations

Stewards:

Larry Goddard 1968-1987

Pat Caldwell 1987-present

Top spots (Sunset, etc)

10-20 min top sets (H1/10th)

Pros:

- explicit surf heights
- inherent knowledge base
(**benchmarks critical**)
- longest, most continuous
(daily data since 8/1968)

Cons:

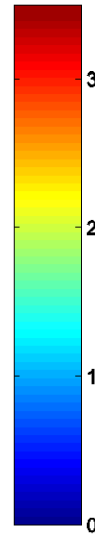
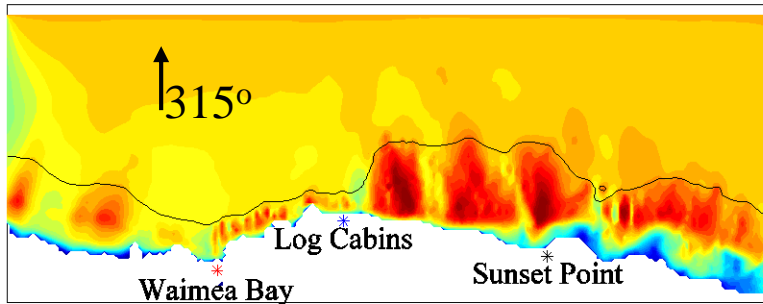
- subjectivity
- only daylight (except Peter Cole)
- course resolution



Simulating Waves Nearshore (SWAN) Model

Incident 2.5 m, 14 second from 315°

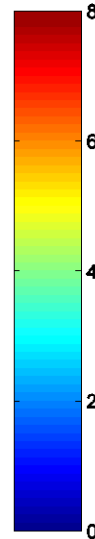
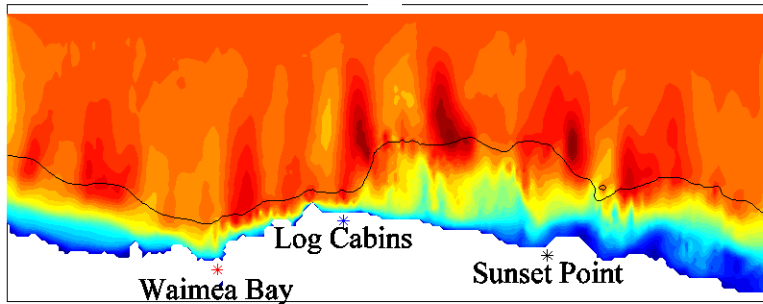
20m
isobath



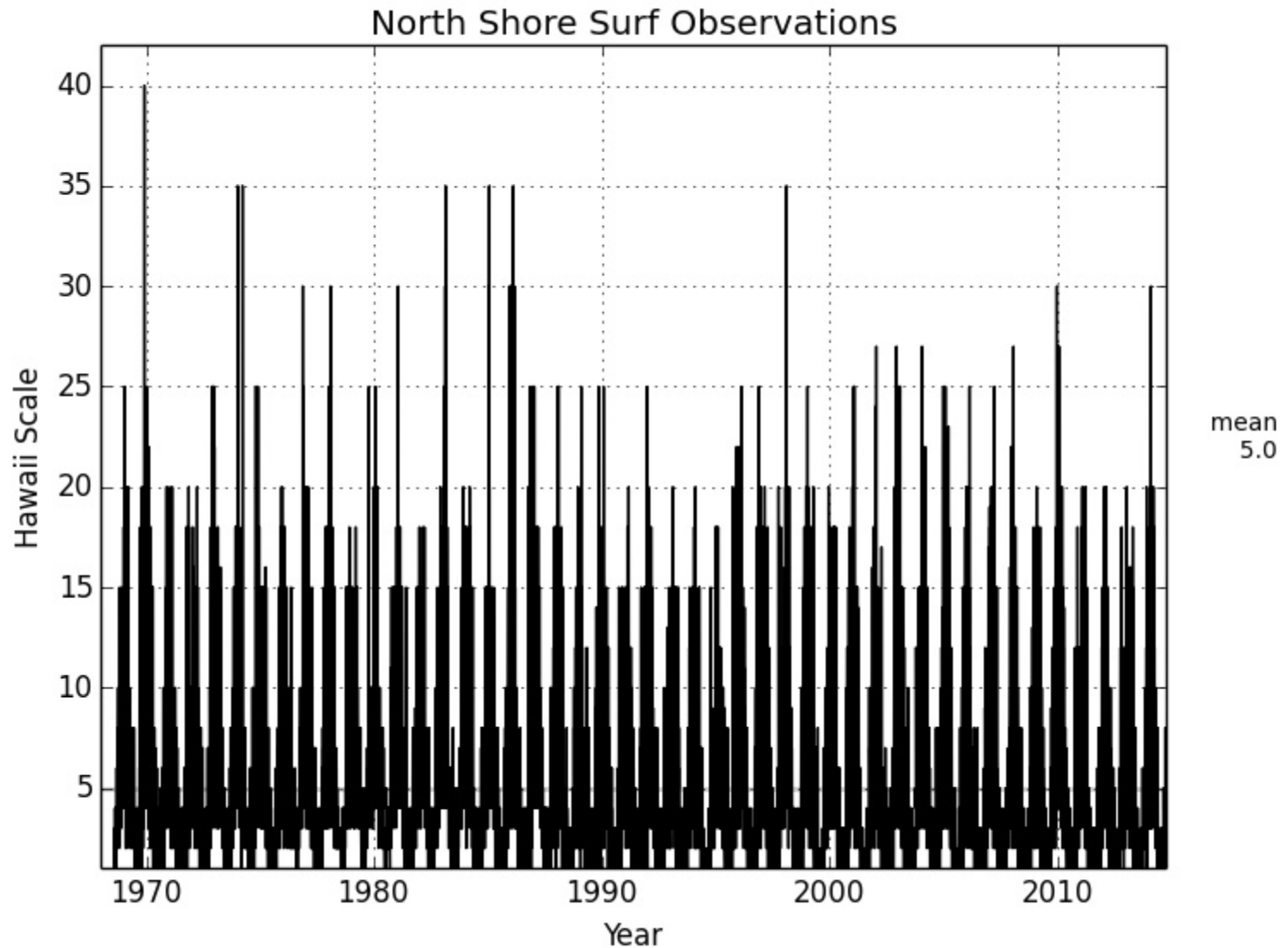
Height (m)

- Includes wave generation by winds, propagation, shoaling, refraction, bottom friction, and breaking
- 50 m horizontal grid

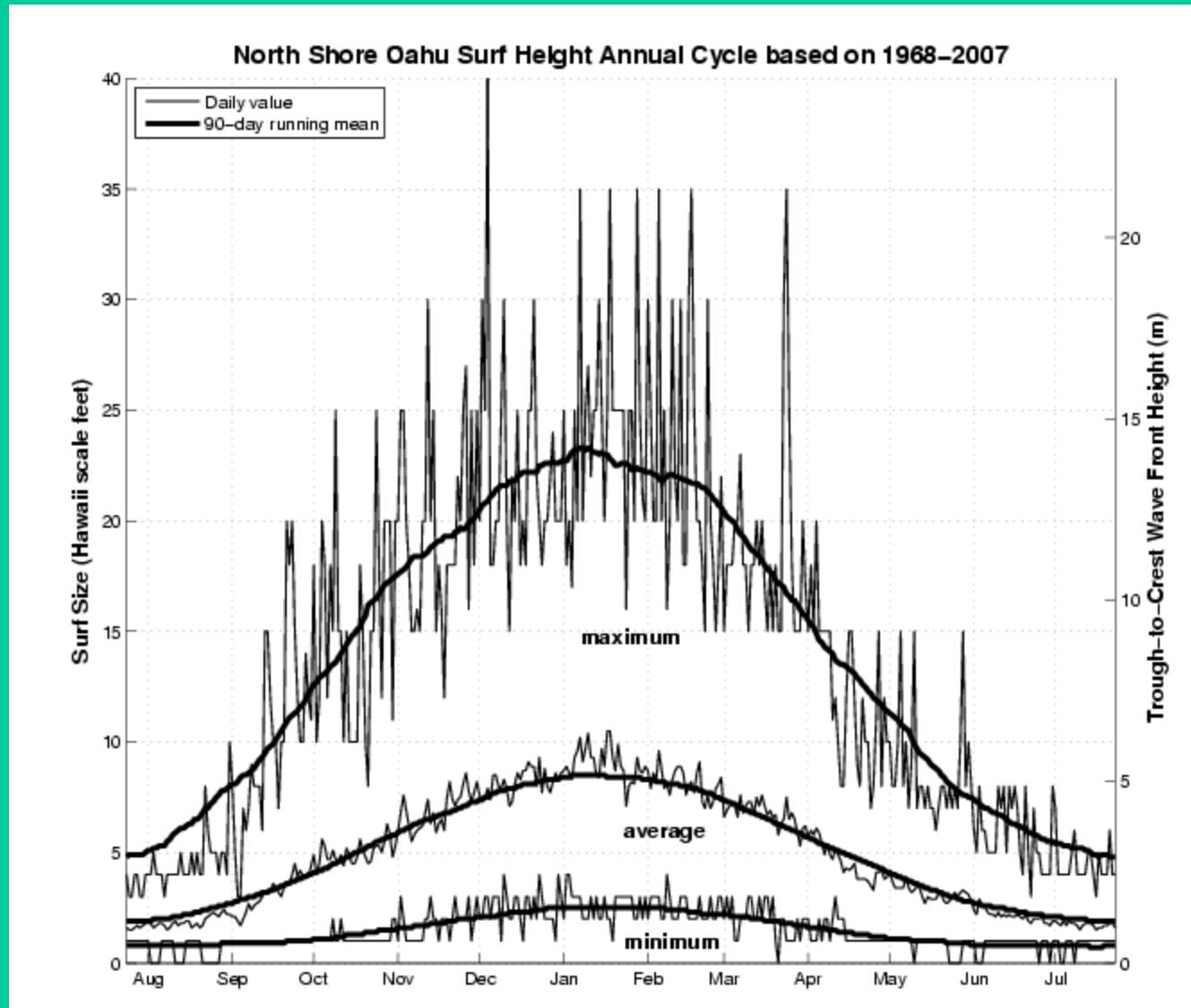
Incident 6.5 m, 19 second from 317°



Surf observations from Sunset
(1-15 Hawaii scale) then
Waimea (15+ Hawaii scale)

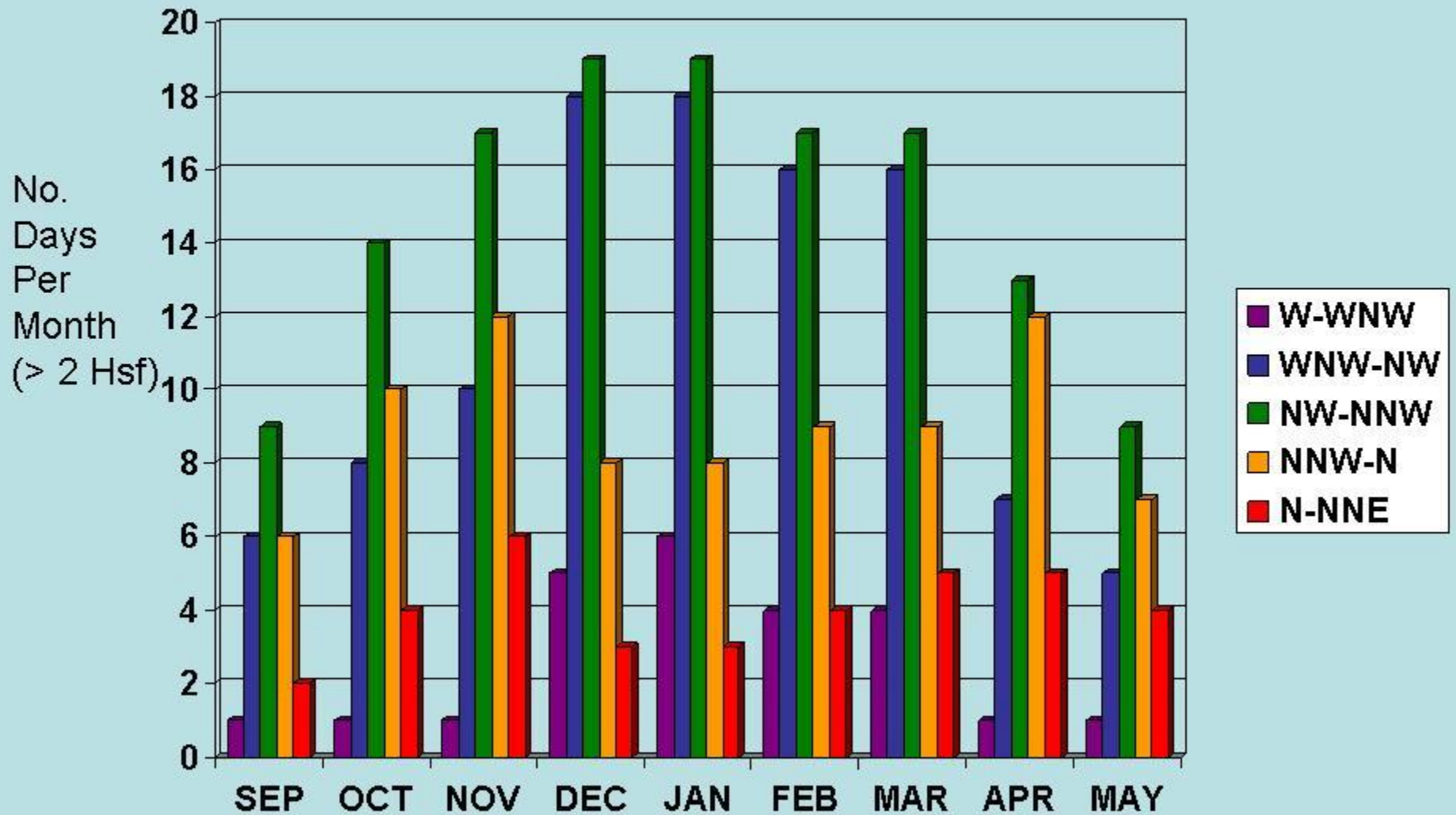


Continuous Daily Observations: North Shore, Oahu, Hawaii

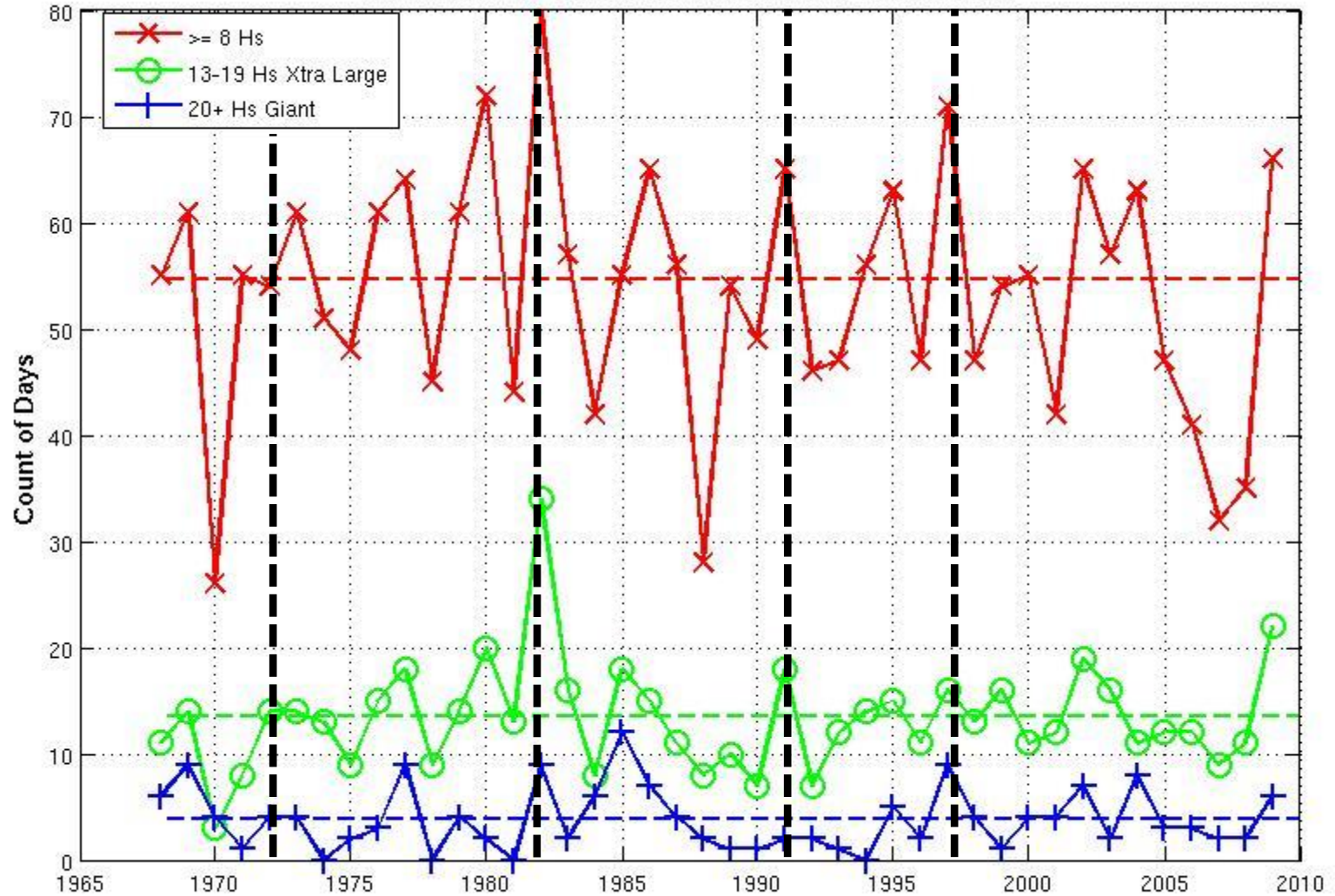


Surf Climatology for North Shore, Oahu, Hawaii

North Shore Surf Direction Climatology



December - March North Shore Oahu Surf



*Hs = Hawaii scale
or 1/2 peak face*

ES
1972-73

ES
1982-83

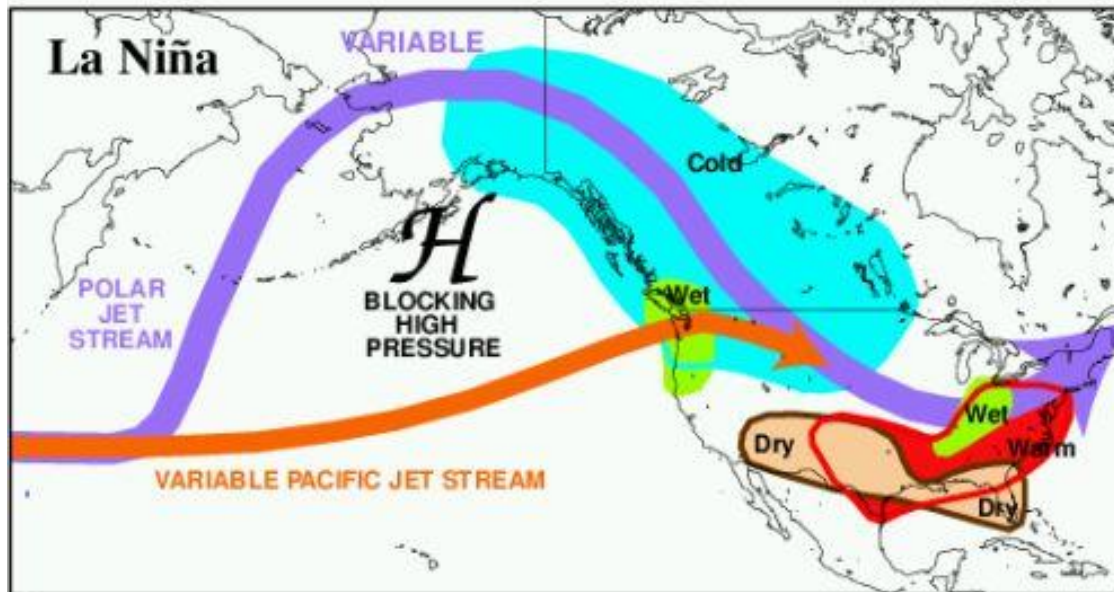
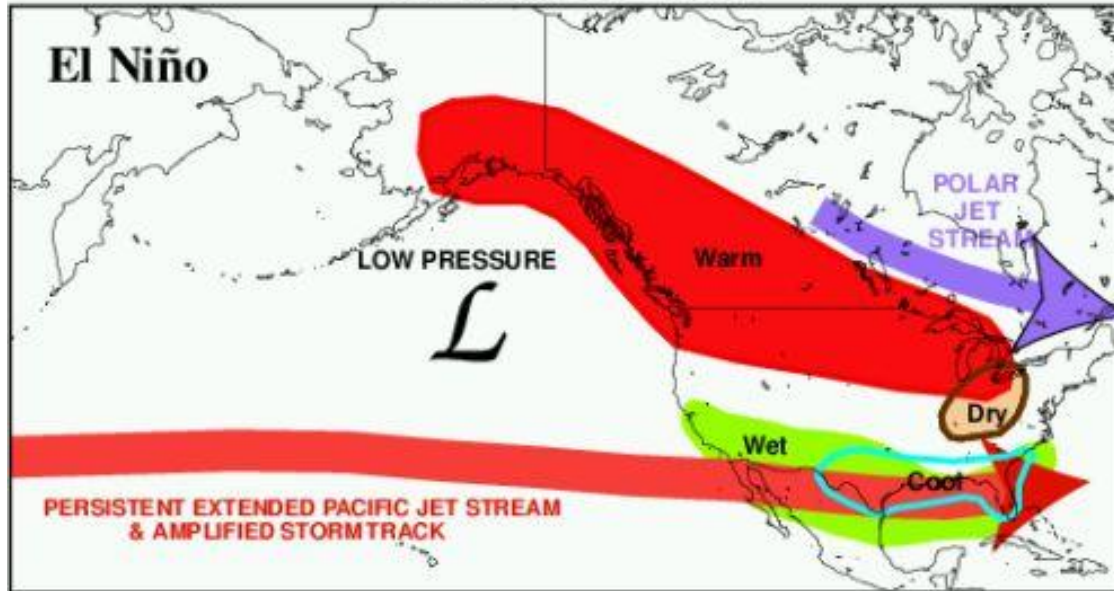
ES
1991-92

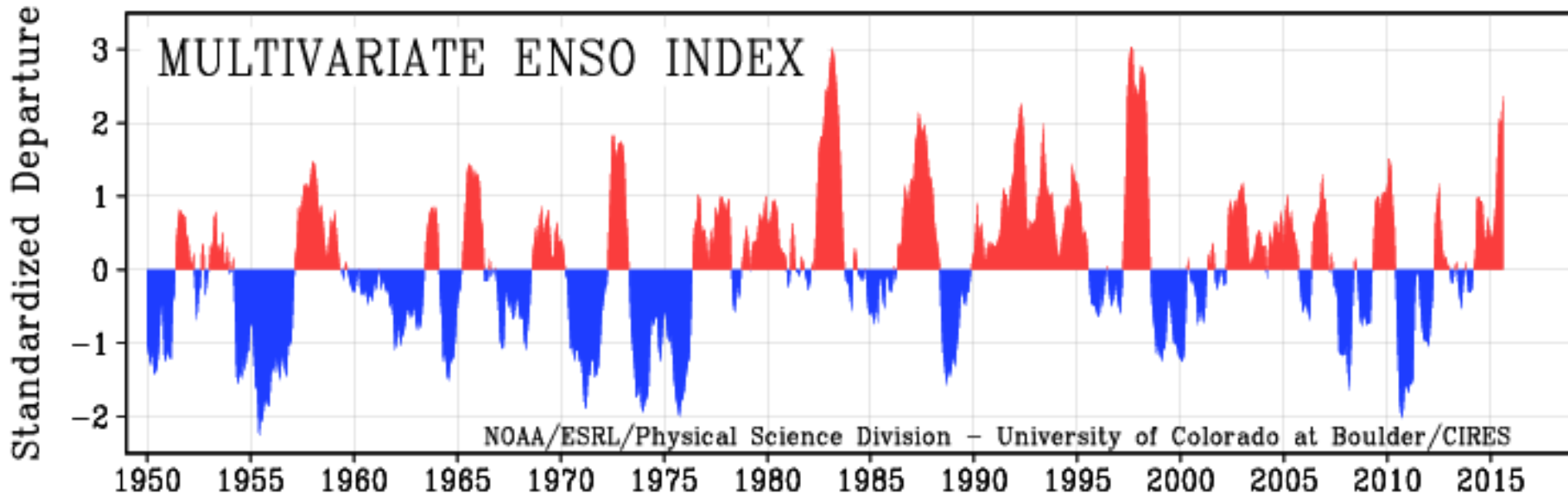
ES
1997-98

2009-10

Goddard-Caldwell Oahu H_{1/10} Surf Observation Data Set

TYPICAL JANUARY-MARCH WEATHER ANOMALIES
AND ATMOSPHERIC CIRCULATION
DURING MODERATE TO STRONG
EL NIÑO & LA NIÑA





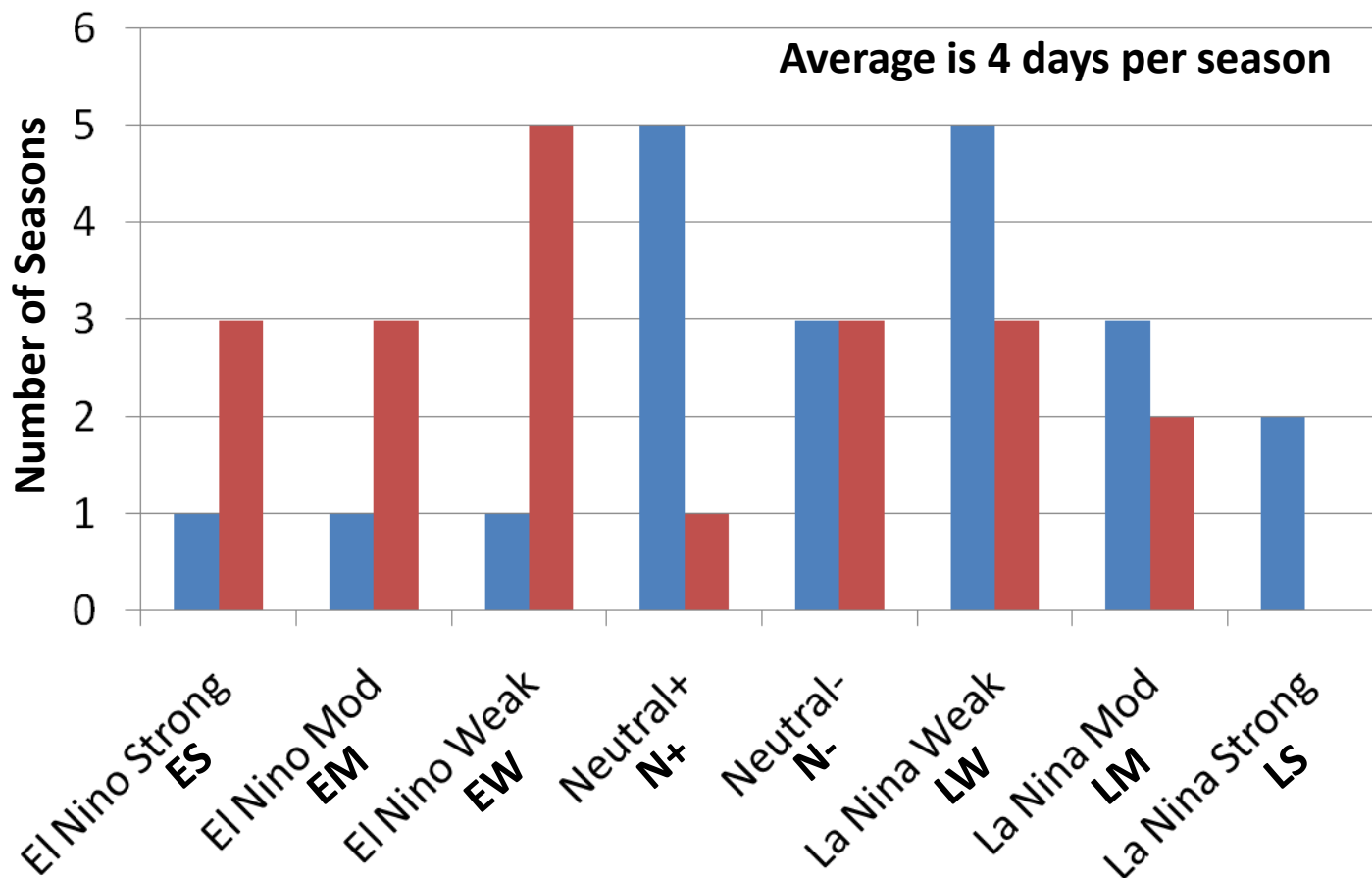
Warm Phase – El Niño

Cold Phase – La Niña

Giant Surf* Variation with ENSO

North Shore Oahu 1968-2009 Daily H1/10 Surf Observations

Count of Seasons (Sep-May) Relative to Average



Lowest 3 Years
 1994-95 (EM): 0
 1981-82 (N-): 0
 1978-79 (N-): 0
 (days/season)

■ < average
 ■ >= average

Highest 3 Years
 1985-86 (N-): 13
 1986-87 (EM): 12
 2002-3 (EM): 11

*giant surf >= 20 Hs at highest spots (H1/10, average of highest 10% heights)

El Nino Strong (EW): 1972-73+, 1982-83+, 1991-92-, 1997-98+,



Case Studies of Giant Episodes



This right here is an official Waimea bay closeout.

DECEMBER 5-8, 2009

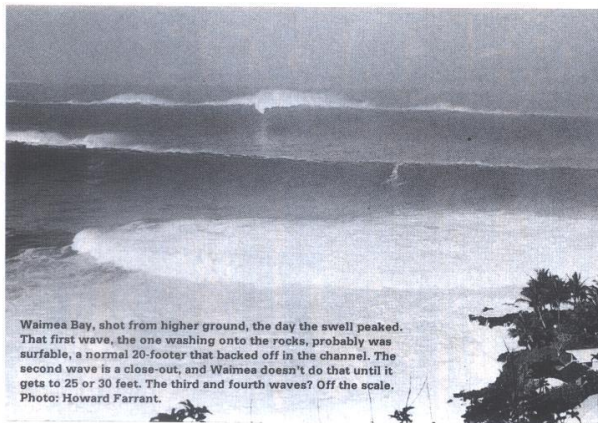
Historical Events:

Swells of Dec2-4, 1969

Surf suggests deep water swell off Waimea of 25' @ 20 sec empirical surf estimate (54' to 68' ocn 90')

What about Jan 28, 1998?

Or Feb 23, 1986?



Waimea Bay, shot from higher ground, the day the swell peaked. That first wave, the one washing onto the rocks, probably was surfable, a normal 20-footer that backed off in the channel. The second wave is a close-out, and Waimea doesn't do that until it gets to 25 or 30 feet. The third and fourth waves? Off the scale. Photo: Howard Farrant.

making it unsafe for passage. On the Big Island, 20-foot waves pummel the village of Miloi, wiping out its fishing fleet, damaging five buildings and eroding 1,200 feet of beach road. On the North Shore, Kam Highway is littered with coral heads, sand and soggy crushed cars. Mayor Frank Fasi declares it "a disaster area." Bob Mahato, a North Shore sanitation employee, calls it "a goddamn mess."

Wednesday, December 3

Surf in Hawaii begins to drop.

Noll: "That was the last day you could drive around Kaena Point without a four-wheel drive. The surf was so big that it blew out the roads. At one section I had Laura get out and run across between sets because big chunks of the road had been torn out by the waves. I was driving with the door open ready to bail out. I'd wait for a lull and friggin' floor it. Right after we got to the other side a long section of the road fell in the drink. That was it."

Thursday, December 4

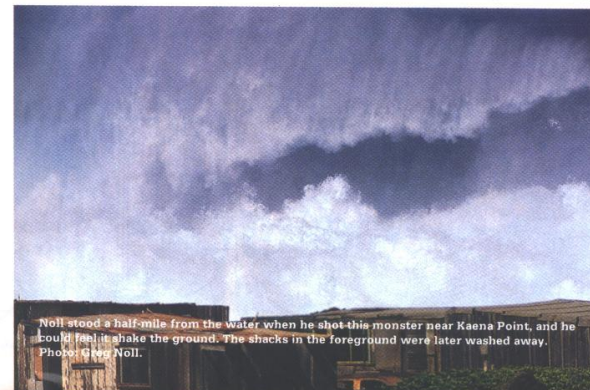
Surf from a second storm slams Hawaii. On Kauai, the home of millionaire John Gregg Allerton, a landmark at the end of Haena Road, is wiped out by one giant wave. Waves up to 25 feet are wrapping around to Oahu's West Side, with water crossing Farrington Highway at three points. A gangly, 14-year-old Shaun Tomson, on Oahu for the first time as a Bar Mitzvah present, watches and takes films of Noll's famous ride from his balcony perch at the Makaha Shores. In Tomson's 14-year pro career he says he has never seen a bigger wave or a heavier ride. Meanwhile, on the Mainland, giant waves begin pounding the West Coast.

Noll: "I got in the water about 10 a.m., and went into a kind of mental freeze-up where everything is in slow motion. When something that big hits you don't really realize it at the time. I'd been surfing for 25 years and my whole focus had been big-wave

riding. I grabbed my board and paddled out. When I got to where the Makaha bowl usually breaks it was just whitewater and slop. The main break was close to a quarter of a mile farther outside. I remember seeing Wally Froiseth and Freddy Hemmings. They tell me Rolf Auness was there, too. It was weird. Usually guys are laughing and joking around. Everybody was just glassy-eyed. Another weird thing—the beads of water would dance on the deck of your board from the impact of the waves down the reef. Like a freshly waxed car. Never seen that before or since. We were sitting so far out you could look up toward Yokohamas and see these things coming down the line a mile away. It was so breathtaking the way the waves were peeling off. You could see them for a full two or three minutes before they got to you. By the time they got to you, you were just demoralized. The talk was basically how to get the hell out of there with your skin."

Friday, December 5

FLIP, the Scripps research ship that stands on its end while floating in the ocean currents, is abandoned 300 miles north of Hawaii when a wave engulfs its upper end.



Noll stood a half-mile from the water when he shot this monster near Kaena Point, and he could feel it shake the ground. The shacks in the foreground were later washed away. Photo: Greg Noll.

The upper end protrudes 55 feet above the sea surface. Because FLIP has no propulsion system, the effect of staying aboard the ship in the giant swells must have been the pogo ride from hell.

Saturday, December 6

Eight to 12-foot surf continues to lash the Mainland. Photos appear later in SURFER as part of a story titled, "1969: The Big One." One photo shows Ricky Grigg tracking down a once-in-a-decade 20-foot face at La Jolla Cove. Another shows Reno Abellira and Forky O'Donnell struggling to make quadruple-overhead Rincon.

Sunday, December 7

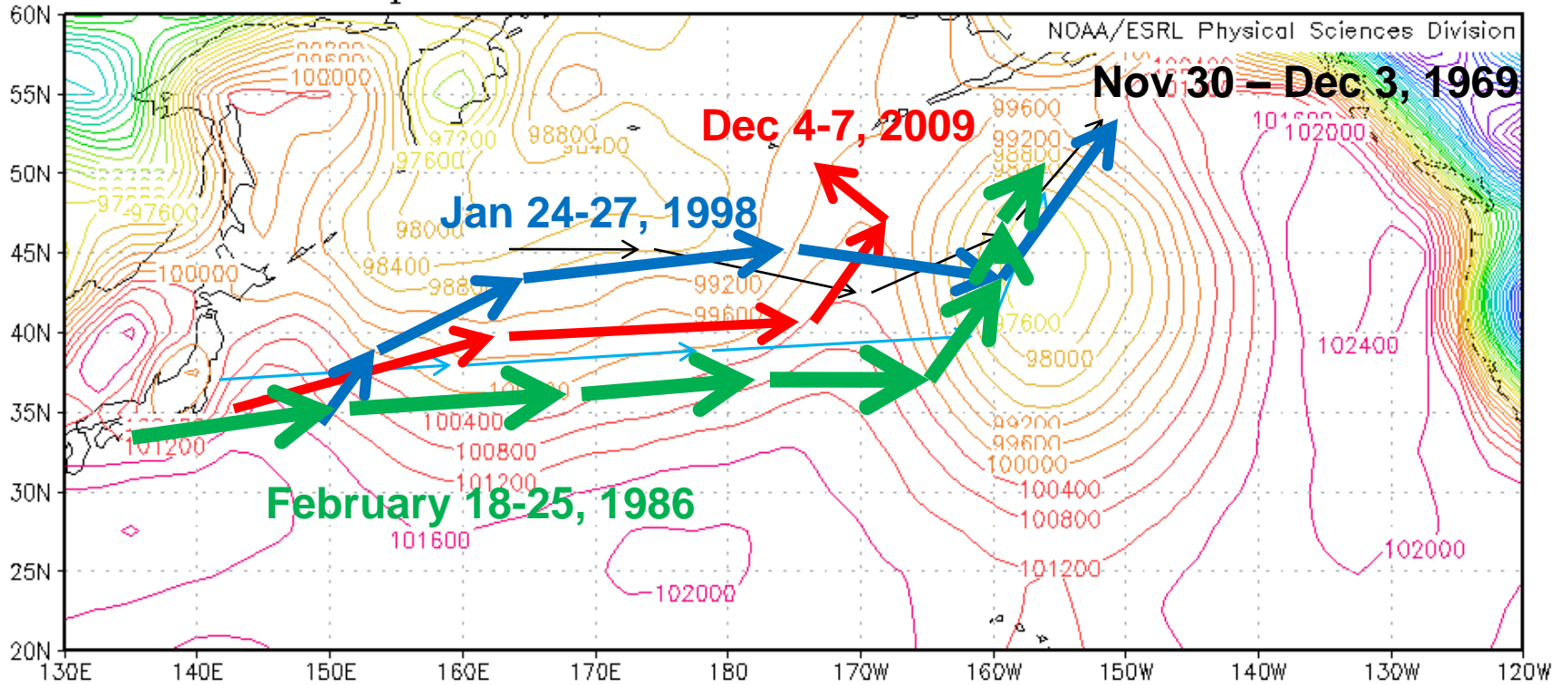
Thirty-nine homes are damaged at Rincon as 12-foot waves sweep the point. Ocean Beach Pier in San Diego has planks torn out and concrete cracked by waves breaking over its end.

Noll: "At one point everybody had gone in and I came to the realization that I'd waited a lifetime for this. I was either going to paddle in and let the moment go by or do something about it. It was such a hard decision because you knew goddamn well that if you made a mistake it would probably kill you. I paddled about five minutes out of the lineup into what might be called a channel. I put my head down and thought about it. The adrenaline was working, the feelings were working, and everything seemed right. I decided I wanted to do it and paddled back over to the lineup. I waited another 20 minutes and let a set go by. The next wave was probably the biggest thing I've ever been in the water with. I turned around, smoked down the side of the thing, hung on to my nuts and went to the bottom. It was the biggest wave I've ever caught by a full 10 feet. Got the shit beat out of me and that's the end of the story." x

[Special thanks to Greg Ambrose of the *Honolulu Star Bulletin*, Ricky Grigg of the University of Hawaii, and Saul Price of the National Weather Service's Hawaii Bureau.]

lon: plotted from 130.0 to 240.0
lat: plotted from 20.0 to 60.0
t: Dec 4 1969 12 Z
lev: 0

Individual Obs pres Pascals



MAX=102552
MIN=86615.8

NCEP Reanalysis Surface Level GrADS image

Buoy 51001 max hourly reading 2/23, **31'@20 sec**
Correction Hs to Waimea: 23'@20 sec
Empirical surf estimate: 50' to 64' ocn 84



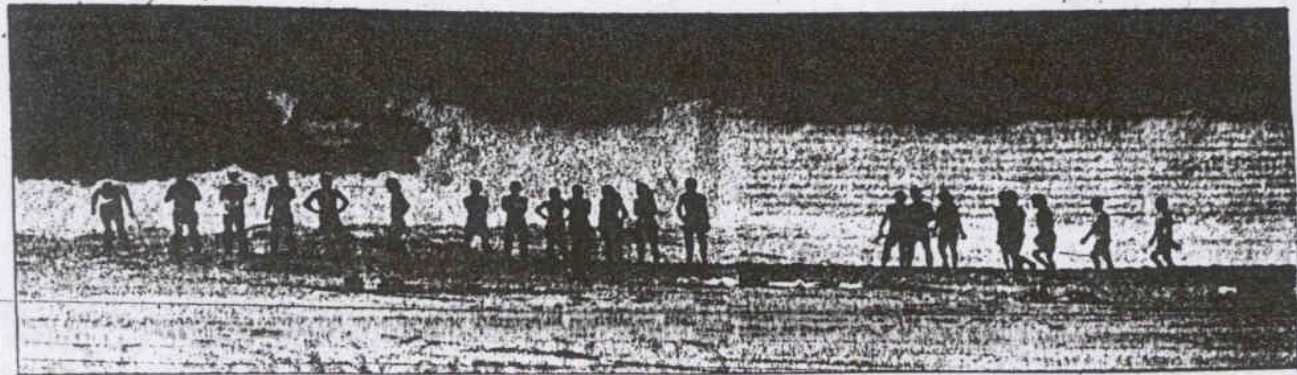
don
chapman

MON. IN A MESS: Welcome to the Messiest Desk in Town Contest. Or as the sign on the side of the desk (you probably wouldn't be able to see it if it was somewhere on top of the desk) reads: "A clean desk is the sign of a sick mind." The subject came up when Michael W. Ferry was taping bits for last night's "Hawaiian Moving Co." at The Advertiser. He made a comment about Wayne Harada and yers truly sharing honors for the messiest desk here — a plain I vigorously disagree because Wayne's desk is much neater. And now come the sports from our fun & games dept., nominating Ferd Borsch for not just the in-house title, but also for the overall Messiest Desk in Town honor: "He's got notes there from Islanders games he covered at the old stadium in 1962" . . . Says Patti Cook, who greets visitors to her Century Square office over stacks of crucial flotsam and jetsam: "Maybe we should have a citywide competition." Yes, we should. Nominations (with explanations) are being accepted here □ □ □

DIS AND DOT: Yes, Joe Moore confirms, that was him and "Wheel of Fortune" hostess Vanna White having a "cozy" dinner last week. They were introduced by Joe's old Army buddy, Pat Sajak, who is also the show's host, during a party at the Waikiki Yacht Club. Joe and Vanna hit it off so well that there were several more dinners and they're talking about spending their next vacations together . . . Is Andy Anderson a candidate for governor? Would he have agreed to be a judge for the Carole Kai Bed Race if he wasn't? . . . From the silly fashion trend dept.: Add managers at Johnny Appleseed restaurant to those who are wearing coats and ties at work . . . Winner of a contest to design Hawaii Loa College's Pacific Center for the Media Arts is Adele Santos, chairwoman of the architecture dept. at the U. of Pennsylvania. Her "East-West influenced design" won over 171 other entries, including 12 from Honolulu □ □ □

White
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IN ONE EAR: Boo flu dot: The high-falutin' get the flu, too. Geraldine Ferraro, former vice presidential candidate,

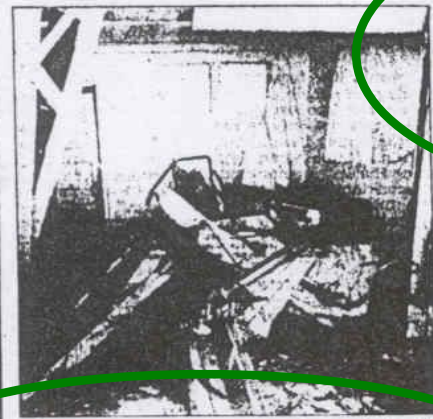


The big surf which damaged several homes late Saturday was still pounding the North Shore yesterday, providing competitive turf for the Quiksilver/Eddie Aikau Big Wave Invitational meet and a spectacle for a beachful-of fans at nearby Waimea Bay.

Huge waves crush N. Shore homes

from page A-1

said Alice Tracy, owner of the Ke Iki Hale vacation cottages where Jenkins was staying. Tracy said she rushed out and found Richard and his mattress washed up against a hedge. Jenkins was later discovered pinned in his bed under a collapsed wall. Neither was reported hurt. Tracy estimated \$100,000 damage to her complex, with one cottage destroyed and a duplex next door heavily damaged. She said she was grateful no one was killed.



Waves pinned Bruce Jenkins in this bed at Ke Iki Hale vacation cottages Saturday night, while his companion floated out of an adjoining bedroom on a mattress.

"We can rebuild," she said. "We can work harder. Nothing happened that is irreversible." The wave caught neighbor Susan Hendry on foot when it climbed a sea wall and carried her bouncing down a rocky lane that had suddenly become a raging river. "It was like a toboggan, except there wasn't any toboggan under me," she said. As she was carried away, Hendry saw a house on the other side of the lane "explode. It seemed to rise up about a foot, the walls go out, and the roof settled down. It was just like in a dream, just as I went flying by."

The entire house was torn from its concrete foundation, crushed, and slammed eight feet mauka before it jammed to a halt against palm and ironwood trees. Owner William Olson was said to be off island. Next door, salesman William "Billy" Graham and his wife, Donna, a computer operator, cowered behind a partition as seven feet of water and foam smashed at the front of their house, shattering one window and carrying a motorcycle and a washing machine and dryer 80 yards inland. Graham tape-recorded the sound of the splatters. Donna also taped yesterday and she replayed the recording, in which Graham is heard yelling, "Oh, God, look! This one's coming over the wall!" The next sound is breaking glass, and then a roar like a 747 going through the house. "I thought we were going to be a meatball sandwich crushed behind that wall," Graham said.

About one-quarter of a mile away, at the Waimea Bay end of Ke Iki Road, a wave hurled boulders at disabled veteran Richard Williams, then tossed him 20 feet into a fence from where he stood at the corner of his house. Williams picked himself up and rushed into the kitchen, only to see a plate window explode in a burst of water and flying glass. He went outside again and tried to board up the window but had to grab the roof and hold on when another 30-foot wave swept in. Williams and his wife, Barbara, snatched up sons

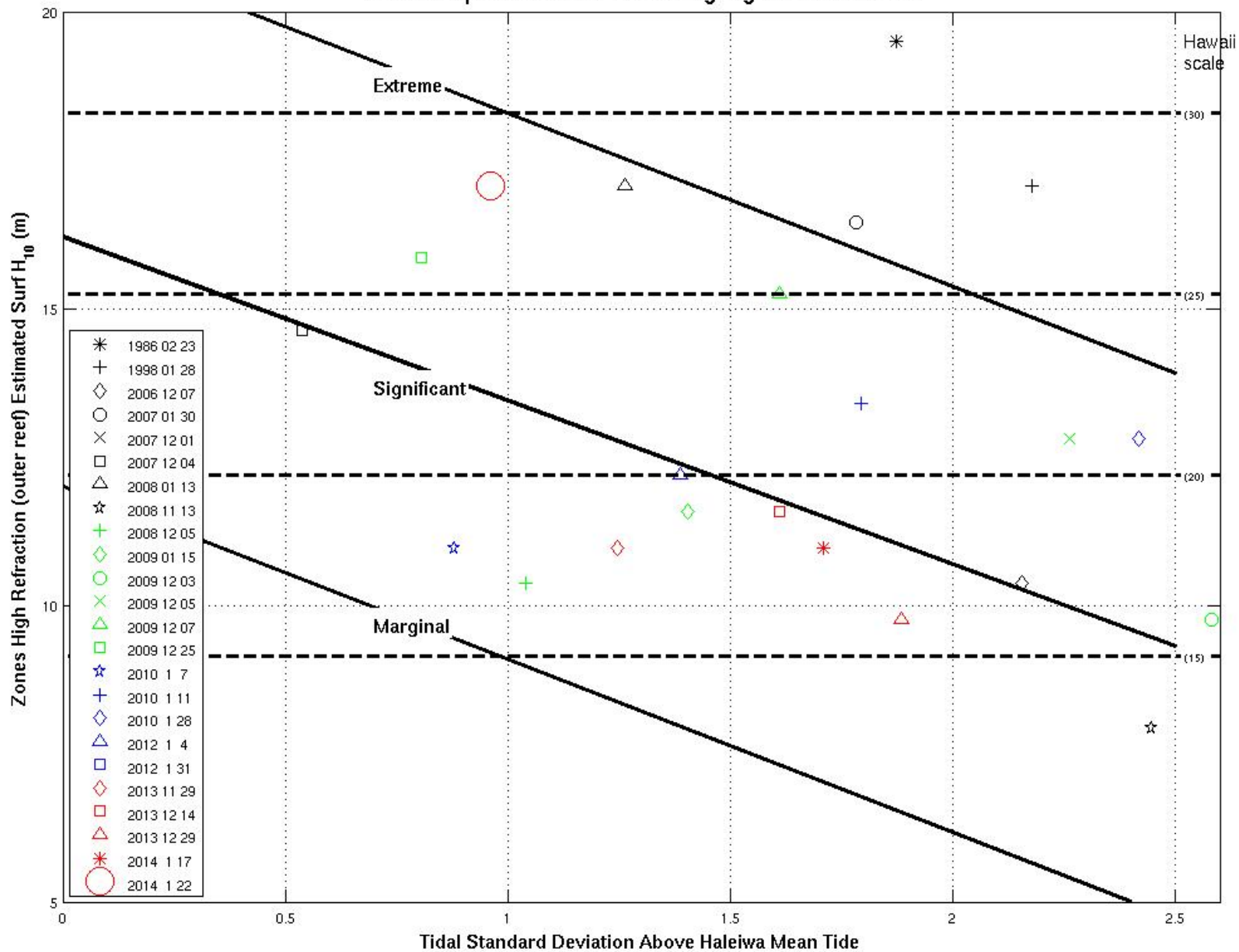
Christopher, 4, and David, 2, from their beds and ran. Most victims and several other residents fled to stay with friends on higher ground. At a Make-Khiff Red Cross shelter at Sunset Elementary School, a handful spent the night huddled on the floor and others slept in their cars in the parking lot. Dozens of other residents suffered property damage when churning salt water rolled through homes, ripped out utility connections and paving, flooded parked cars and carried away personal possessions. Most of the renters and some of the owners had no insurance.

Yesterday, Civil Defense volunteers warned sightseers off the beaches, and police motorcycle officers tried to clear a monster traffic jam made worse by a nearby surf meet. Stunned surfers who cruise that coast awoke to find four-new house-sized rocks pushed up on an offshore reef. Bob Williams, Oahu Civil Defense logistics officer, said eight homes, including one fourplex and one triplex, were seriously damaged by waves carrying 6,000 pounds of energy per square foot, in less than an hour beginning at about 11:30 p.m. Saturday. A high surf advisory had been in effect for several hours Saturday, and Civil Defense alerted the media to chances of sets reaching 30 feet. Williams of Civil Defense said the sets increased in size from 12 feet to 35 feet in only about 45 minutes late Saturday. A high surf advisory remained in effect last night for the north and west shores of Kauai and Oahu. Along the coast, people dug out and made plans. Lee Murray, who has seen two people drown outside her window in the past year, said she never wants to live on that shore again. Donna Graham said, "People say it's a rare thing, so we were thinking maybe it won't happen again." Richard Williams said: "I'm going to stay and fight."

2
4

F
E
B

Coastal Impact Guide for Coinciding High Surf and Tides





Comments/Questions???