

The Last Mile

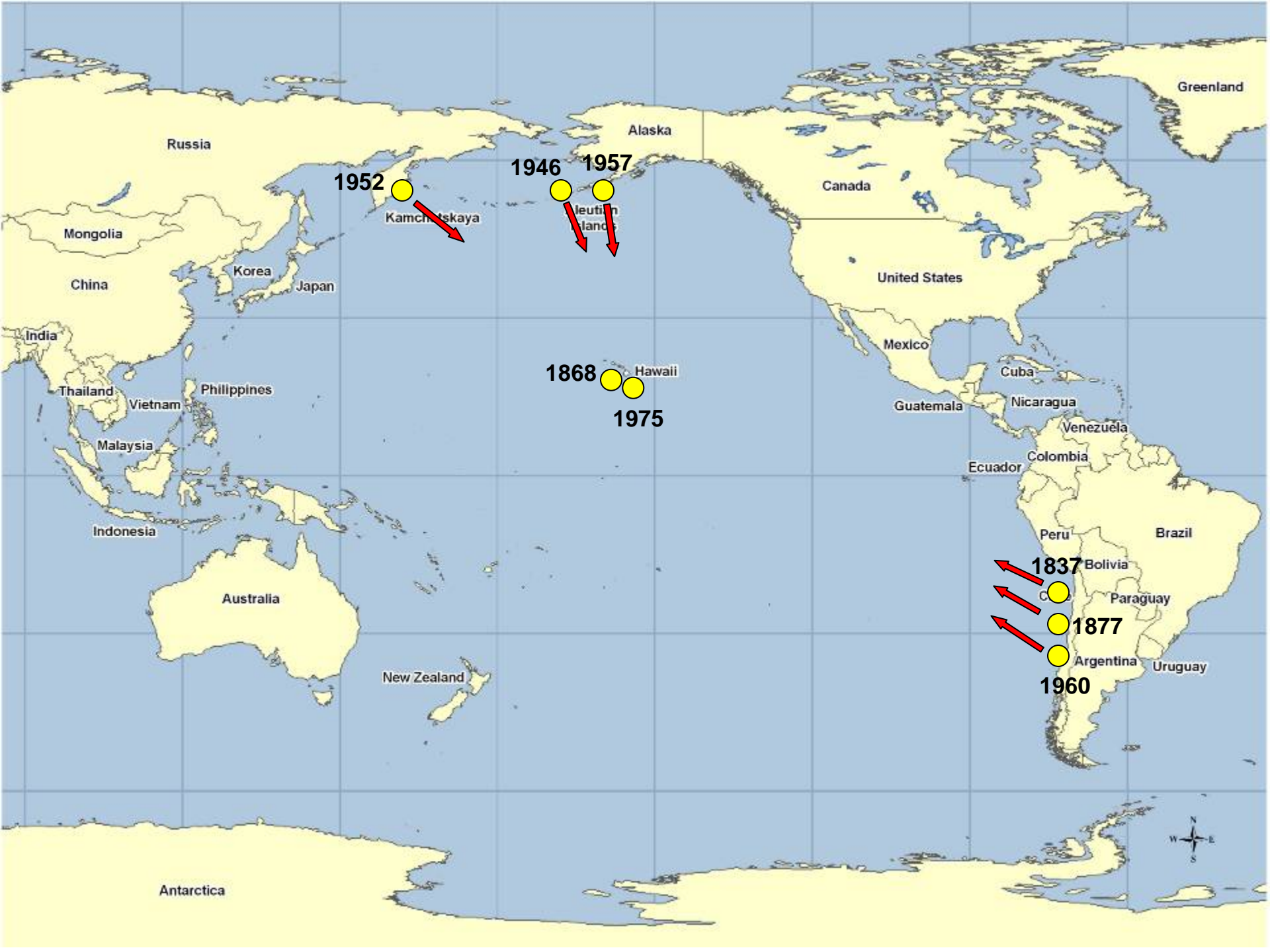
A scenic view of a coastline. In the foreground, there is a large body of blue water with gentle ripples. In the middle ground, a dark green shoreline is visible with some buildings, including a prominent white cylindrical tower. In the background, a long, low mountain range stretches across the horizon under a clear, light blue sky.

Hawai'i County Civil Defense
Harry Kim, Mayor

Severe Tsunami Impacts on Hawai'i



The clocks stopped—and so did nearly everything else in Hilo—when the wave struck shortly after 1 a.m., Monday, May 23, 1960.



Hilo - 1960









Sturdy parking meters weren't sturdy enough.





Hilo before 1960 tsunami



Hilo after 1960 tsunami



Hilo after 1960 tsunami



Tsunami impact area today





**Major Lessons Learned During
the Development of Early
Warning Systems**

Tsunami of 1960

Tidal Wave Disaster Points Up Flaws In Warning System

Rescue Efforts Uncoordinated

Many of those who died quickly and peacefully, others met their death in agony beneath the heaving wreckage of their homes.

Some of the injured were trapped until dawn, their lives in jeopardy. Their cries went unanswered, they were helpless. Friends and relatives searched for them in vain. Some were rescued, others were taken to a hospital. Many were taken to a hospital in the city. But there was no preparation, no organized rescue force in the area. It was a total disaster.

There is still a lot to be learned from the disaster. It is a tragedy that has struck the world. It is a tragedy that has struck the world. It is a tragedy that has struck the world.

STORY BEHIND THE STORY

The search for the bodies of the 100 who died in the tsunami was a task that took weeks. The bodies were found in the wreckage of their homes. The bodies were found in the wreckage of their homes. The bodies were found in the wreckage of their homes.

False Alarms Tend To Result

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Hilo Tribune-Herald, Tuesday, June 7, 1960

TIME TO INSIST ON ANSWERS TO A MAJOR ISLAND PROBLEM

From both sides of the political fence come demands that the warning system mess be cleaned up.

And from Peter Pakele, hard-working Civil Defense director here, comes word that his plan to improve the local warning system has been submitted to the Board of Supervisors.

Nearly everybody agrees that the system is much less than the community has a right to expect. The Big Island in particular—because it has suffered so deeply—applauds the quick action of its own and of Elmer F. Cravalho, speaker of the House.

Both have said they will consider special investigation of the problem. There actually is more than one problem.

The Tribune-Herald was the first to point out the need for an international warning system. Last month's devastating wave originated in Chile, but we knew virtually nothing about it except that it was on the way.

This is the time for Federal funds to be made available for research into habits of seismic waves with a view to developing a device for tracking them. Studies of our apparent susceptibility to waves also are indicated. This is more than a local problem, and immediate Federal action seems proper.

The local warning and disaster relief program poses another problem, one that is related to waves but one that could be related to enemy attack.

The State's investigation should be concerned with seeking remedies, and must not be destroyed by political maneuvers.

There must be a clearly-understood plan of action and authority right here on the Big Island in the event of another disaster. Everyone must know who gives the orders and how the local mechanism operates if disaster should result in a breakdown of communications between the Big Island and Oahu. Fast action is imperative. Disaster may strike at any time. We're not ready for it now.

☆☆☆

Tidal Wave Disaster Points Up Flaws In Warning System

Rescue Efforts Uncoordinated

Many of them died quickly and mercifully. Others met their death in agony beneath the tangled wreckage of their homes.

Some of the injured were trapped until dawn, their pain increasing, their cries unanswered, their hopes fading.

Friends and relatives removed some of the victims from the wreckage, volunteers aided a few and police officers freed many.

But there was no organized, concerted rescue drive in the Hilo disaster from the time the wave hit until dawn.

There is this entry on the log of Civil Defense headquarters in Hilo, timed at 3:25 a.m., a little over two hours after the wave hit:

"Order issued that no one is to enter the area until daylight."

A policeman on duty outside devastated Waiakea town told a reporter at about 4 a.m.:

"There is a family trapped in their house but they won't get out until daylight because we are afraid another wave may hit and we don't have proper lights."

Other police officers acted more rapidly.

* * *

Rescue efforts in the downtown area began soon after the wave hit and many officers worked in the Kimierville area.

But the workers were too few, too disorganized and too poorly equipped to reach all the victims in time.

A tsunami authority, had one been used, probably would have told officials that wave action in the bay after the big wave was normal turbulence and another wave would not hit.

And a few portable searchlights would have worked wonders had they been available.

An indication of the number of people trapped and the effectiveness of one good light and three men came from Kimierville.

John Aubuchon, deputy superintendent of Hawaii National Park, and Park Ranger Bob Barrel, offered their services to police.

* * *

The Park officials were equipped with a nine-volt portable searchlight which Aubuchon carried.

With an unidentified police officer, they entered the Kimierville area at 2 a.m.

When they left two hours later they had freed 18 victims from the wreckage.

There apparently was no store of serviceable lights available and no advance plans to call on plantations half an hour away for tractors equipped for night harvest work which would have been invaluable in probing the wrecked areas.

A lack of advance planning raised Hilo's death toll.



TSUNAMI OBSERVERS—This picture was taken at the Hukilau Restaurant by Tribune-Herald photographer Larry Kadooka as the first wave of the May 23 tsunami swept inland.

The crouched figure in the foreground apparently is attempting to grab fish which were swept in by the wave. Supervisor James Hamasaki, with camera, looks on.

Many Confused By New System

Copyright 1960 By Honolulu Star-Bulletin

Many of them died in their sleep. Others were trapped in their homes as they drank coffee, watched television or just waited.

And there were the sightseers who thronged the waterfront areas and watched the water ebb out of the bay, a sure sign of impending disaster.

Why didn't Hiloans leave the low areas when the alert sirens sounded?

Why did parents keep their children at home to die? The answers are varied and combine into a picture of mass mental indecision, confusion and misinformation.

The sirens in the waterfront network sounded a series of five blasts between 8:30 and 8:50 p.m.

This warning was in accordance with a plan adopted by Civil Defense on a statewide basis in March 1959.

Previously the sirens had been sounded in two cycles, an early

STORY BEHIND THE STORY

The careful research and reporting of Ed Engledow and Ed Edwards in today's stories about the disaster warning system are outlined in an editorial on page 4.

warning and then a final warning just before the wave was due to hit.

Big Island officials and residents of the Hilo waterfront vigorously opposed the change, contending that people were accustomed to the old system which had worked effectively in the past.

A lack of knowledge of the change comes up frequently in a survey being conducted by the Hawaii Island chapter of the Academy of Science, whose members were greatly disturbed by the refusal of many to evacuate their homes.

The group is attempting to interview everyone who was displaced. Information gathered will not be evaluated until the survey is complete.

* * *

The evacuees are asked such questions as how they received the warning and why they did not leave their homes.

These are some of the startling answers:

"A victim, whose education includes some college training, 'waited for further warning.'"

"A family who weathered the 1946 wave in the same area 'didn't think it would come as far as our house.'"

"A Kimierville resident was listening to the radio and 'didn't think it sounded urgent.'"

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The clocks stopped—and so did nearly everything else in Hilo—when the wave struck shortly after 1 a.m., Monday, May 23, 1960.

The Big Wave—May 23, 1960

Nearly everyone on the Big Island of Hawaii was listening to radio reports being broadcast from Honolulu, some 200 miles away.

Announcers said that an earthquake in far-off Chile had generated a seismic sea wave. The wave might be dangerous to Hawaii, because it might not wear itself out even after travelling 6,700 miles at high speed.

Many people left their homes in low areas. Others were packed and ready to flee, waiting for some kind of "final warning."

In Hilo, principal city on the Big Island, many waited for word of wave action at South Point some 70 miles closer to Chile.

Everyone waited through a long Sunday night. Then, a little after midnight, a Hilo Tribune-Herald reporter phoned his office.

There was water on Banyan Drive in the Waiakea Peninsula area of Hilo, he said. The time was about 12:20 a.m.

There were two more waves, but no flash of danger from South Point.

Then there came a sound like an express train approaching. It was no train, because the Big Island's railroads were wiped out in the 1946 tidal wave.

I was sitting in my office at the Tribune-Herald, two blocks from Kamehameha Avenue. On the other side of Kamehameha Avenue is Moohau Park, beyond that a bayfront drive and then the water of Hilo Bay.

When I heard the roar I raced out of the building and onto Mamo Street, where I started toward the bay.

The street was almost deserted. Policemen prevented the curious from entering the area, but the press was admitted. I was headed toward the intersection of Mamo and Keawe Streets, one block closer to the bay than the Tribune-Herald Building.

Just a few minutes earlier I had stood there talking with the policemen and wondering why more people weren't evacuating the area.

But before I could get more than a few yards down the slope of Mamo Street I saw it.

The streetlights were still on. Suddenly they were overwhelmed by The Big Wave, the fourth one of the early-morning hour. It was as high as a two-story building.

There wasn't long to look at it.

With bizarre flashes like the lightning of a dozen low-hanging thunderstorms all piercing the sky at once, the street lights and all the other lights in the waterfront district went out.

The roar of the massive wall of water blended with the crashing of dozens of stores and apartments and theatres and restaurants—and with the screams of dozens of persons for whom the final noisy warning came in the same moment with death.

I ran up the hill of Mamo Street, more frightened than I can now even recall.

My wife told me later that she had been watching the downtown area from our home in the hills beyond the city. She said it looked as though the whole town had exploded. The biggest burst came from the Hilo

“I thought my home was safe because the 1946 tsunami did not come here. When I saw a lot of people by the pier, I thought I must be safe or they would not stay there.”

- Mrs. Ito, tsunami survivor

Tsunami of 1975

What tsunami? Alert system told little

By BRUCE BENSON
Advertiser Staff Writer

I felt decidedly unhappy with myself as we stepped off our boat at the Ala Wai Harbor and headed for high ground. The newspaper had called about 10 minutes earlier, reporting that an earthquake hit the Big Island, causing the water to recede from Hilo Bay.

My frustration grew out of feeling foolish about abandoning the harbor when everything seemed so tranquil, yet doing nothing — and getting struck by a tidal wave at the dock.

I thought, "My boy, you've been watching too many disaster movies." We gathered camera and film, and started toward the exterior elevator that led to the top of the Iliki Hotel. "Uman, would it be safe up there?"

I WAS PARTICULARLY annoyed at the pleasant calm of a sunny Saturday morning. Everything normal. Last week's storm gone. The radio full of its commercials and music. No marine warnings on the recorded message of the weather service.

Surfers were lifting their boards off a battered VW van. And here we were, heading for high ground. Because if the quake had generated a tsunami, I knew that it would arrive at Maui in about 20 minutes; at Oahu in about 35 minutes; and Kauai in about 50 minutes.

I also knew that no tsunami alert system was in use for a locally produced wave when the Islands were last at risk in April 1973.

The regional alert system is based on the idea of hooking up tide gauges and seismometers to the Honolulu Observatory of the National Oceanic and Atmospheric Administration. By telephone lines and radio transmission, data on quakes and rapid tidal changes can be sent to the observatory.

IF IT ALL spells a tsunami, the observatory calls civil defense, which then warns residents along the Island chain to head for high ground.

In 1973, this system was not yet hooked up for lack of estimated \$45,000. I had no idea yesterday morning whether the seismologists and budget makers had gotten the thing worked out.

So, feeling even more foolish, I quickly called a few friends with boats in the harbor to give warning before leaving our own vessel.

Thoughts of Chicken Little were very much on my mind as we gazed out from the upper land of the Iliki.

Just a few moments later, I felt re-decided. A live newscast came over the transistor radio from Hilo, reporting that the Big Island had been badly shaken up. Authorities at that moment were evacuating residents from the Hilo Bay area and emptying the hotels of their guests.

AS THE DAY developed, it turned out that indeed there had been what the seismologists called "tidal action" induced by the quake. It was relatively minor, but waves traveling unannounced at 300 miles an hour or more set up these unofficially reported tidal variations:

- Hilo — 6 feet.
- Kona — 1 foot.
- Maalaea Bay, Maui — 3 to 5 feet.
- Hana — 5 feet.
- Honolulu Harbor — 8 inches.
- Lihue — 1 foot.

Herman J. Warr, director of the Honolulu Observatory, later reported that the local alert system is largely in operation, although certain segments must still be hooked up.

But the conclusions I drew from yesterday's events include these:

- If a disastrous tsunami or tsunami-like wave ever is spawned from a local earthquake, it will be essential to know about it immediately so that residents down the Island chain will have at least a few minutes to head for high ground.
- The local alert system should either announce that there is danger, or that there is not. Yesterday it did neither, leading a worried sailor to hear on the radio about the evacuation on the Big Island while there was no concomitant notice of impending trouble in Honolulu.

California Tsunami Warning of 2005

“In Santa Monica, officials thought it was ‘just informational, only a bulletin,’ said Police Sgt. Jeff Wiles. Assuming that they would receive an update if the situation became more serious, city officials decided not to open their emergency operations center.”

Los Angeles Times

June 16, 2005

“In Huntington Beach, the police watch commander on duty had trouble interpreting the bulletins and wasn’t sure whether a tsunami warning was actually in effect. ‘They were confusing to read through,’ said Lt. Craig Junginger.”

Los Angeles Times

June 16, 2005

“Lon Waxstein, commander in the Half Moon Bay Police Department, said he didn’t think there was a reason for panic. ‘People need to get a grip,’ he said.”

Los Angeles Times

June 15, 2005

“Larry Collins, the Los Angeles County Fire Department captain on the county’s tsunami task force, said, ‘We don’t have a consistent plan statewide or even county-wide. Right now, some places evacuate and others don’t. Each city makes their own rules, and there’s no governing body that says, ‘You will operate consistently like this,’ he added.”

Los Angeles Times

June 15, 2005

“In Crescent City, there were several reported car accidents as people jammed the roads, trying to make their way out of town, said resident Calvin Maready. Others decided to go down to the beach, to wait for the waves. ‘I don’t know what was going through their heads,’ he said.”

Associated Press

June 16, 2005

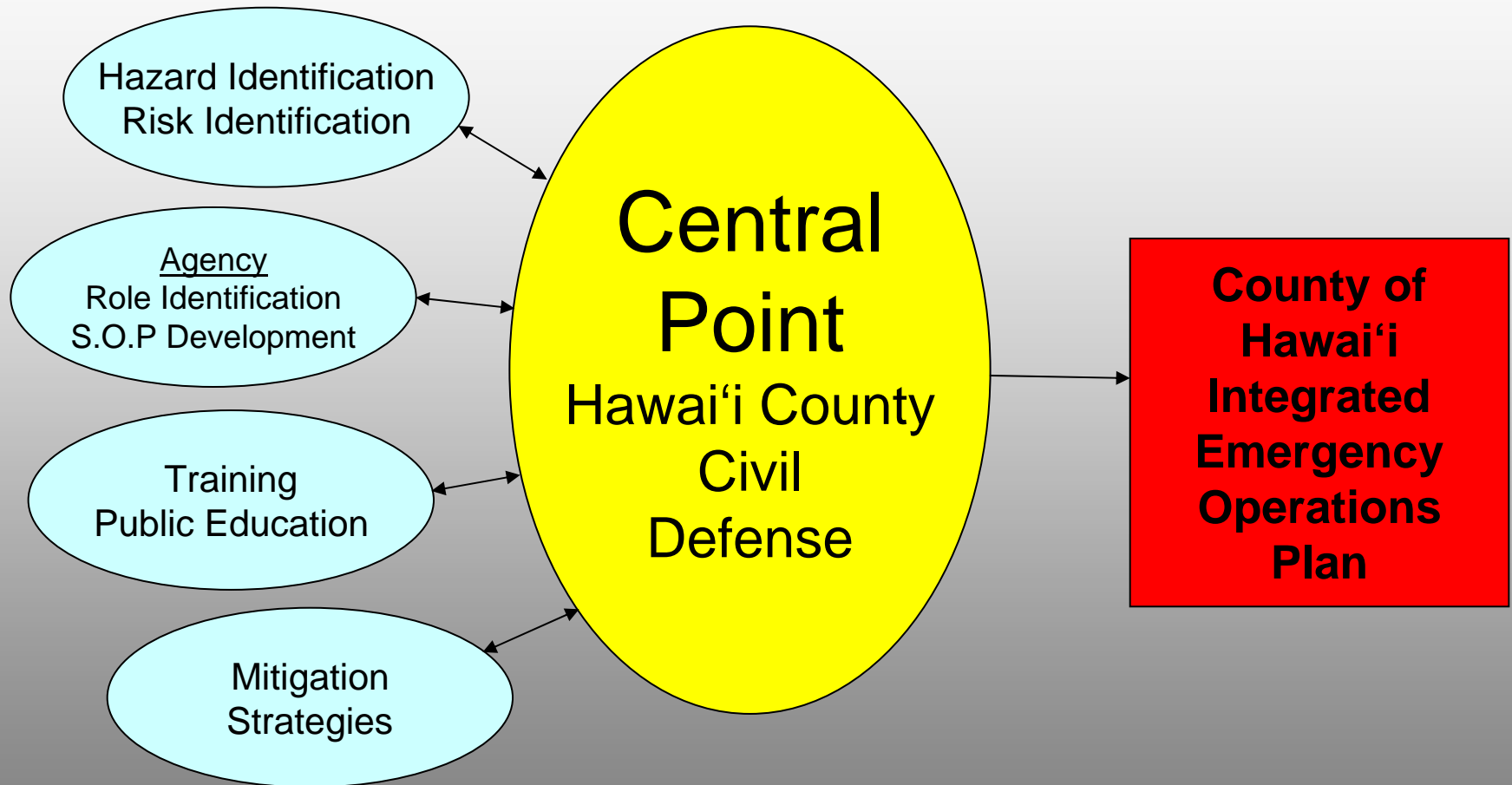


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HAWAII
COUNTY
CIVIL DEFENSE
AGENCY

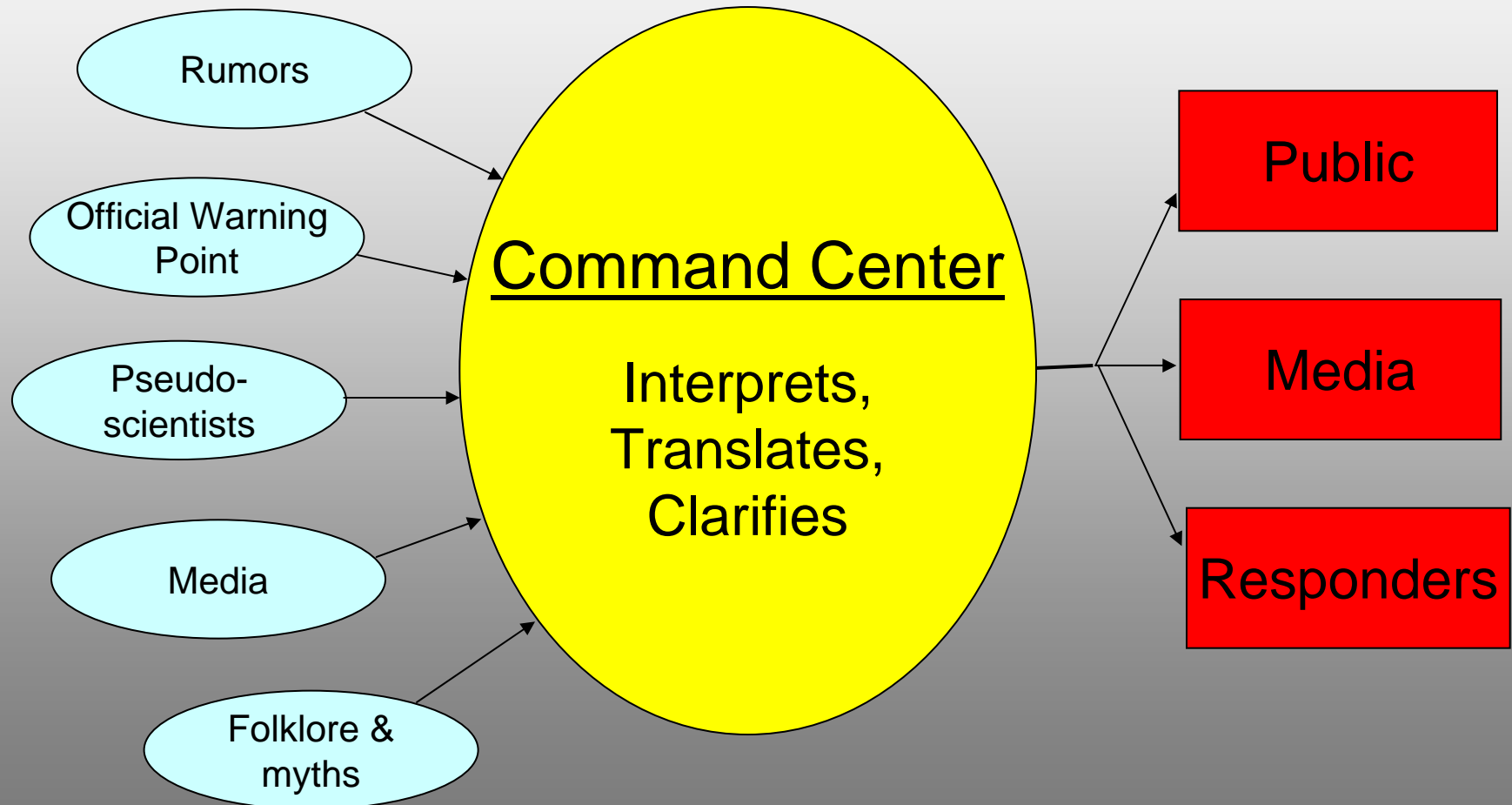
Hawai'i County System Today

System and Plan Development

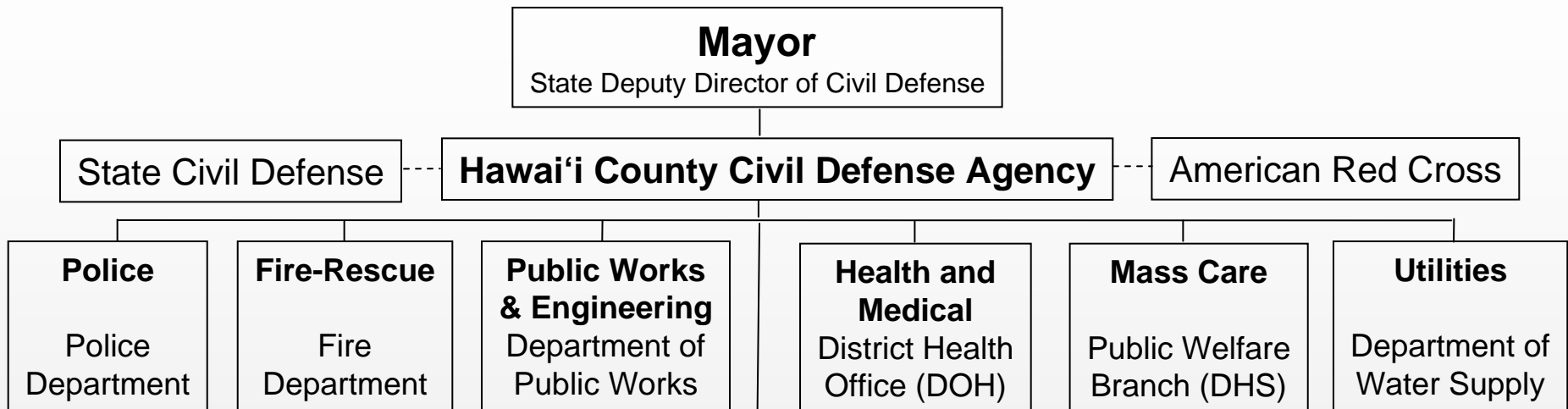


All department and agencies are responsible for developing and maintaining supporting disaster response plans in consonance with this Basic Plan.

Coordination of Information Releases



County of Hawai'i Disaster Response Organization



Support Organizations

Cooperating Agencies

County Departments and Agencies

Dept. of Civil Service
 Dept. of Finance
 Planning Department
 Dept. of Liquor Control
 Dept. of Parks and Recreation
 Corporation Counsel
 Transit Agency
 Office of Aging
 Other County Agencies (as needed)

State District and Branch Offices

Dept. of Acctg. & Gen. Svcs.
 Dept. of Agriculture
 Dept. of Bus. & Econ. Dev.
 Dept. of Comm. & Con. Affairs
 Dept. of Corrections
 Dept. of Defense
 Dept. of Education
 Dept. of Hawn Home Lands
 Dept. of Labor & Ind. Relations
 Dept. of Land & Natural Res.
 University of Hawai'i
 Office of Con. Protection

Hawai'i Electric Light Co.
 Hawaiian Telcom
 Gas Company
 Civil Air Patrol
 Boy/Girl Scouts
 Religious Groups
 Charitable Organizations
 Tour Bus Companies
 Fraternal Groups
 Business & Professional Associations
 Labor Unions
 YMCA-YWCA-YBA
 Nursing Associations

EBS Station
 Amateur Radio Club
 Medical Groups
 Civic & Service Groups
 Coast Guard Reserve
 Coast Guard Auxiliary
 Salvation Army
 News Media
 Radio & Television Broadcasting Stations
 Trade Associations
 Hotels and Resorts
 Visitor Industry (HVB)
 Private Schools
 Other







POLICE



FIRE



LOCAL GOVT



ST. HWYS







HILO

HALE COUNTY CIVIL DEFENSE NETWORK

PUBLIC BUILDINGS & FACILITIES

- 1 Hilo Hospital
- 2 Hilo High School
- 3 Hilo Intermediate School
- 4 County of Hawaii
- 5 City of Hilo
- 6 Aloha - Olini Amphitheater
- 7 Seven Seas Luau House
- 8 Earl K. Long Park Tennis Pavilion
- 9 Sparks Kahanui Swimming Pool
- 10 Kaula School
- 11 University of Hawaii
- 12 Waialeale High School
- 13 Waialeale Intermediate School
- 14 Waialeale Elementary School
- 15 Hawaii Community College
- 16 Kneekaha School

EMERGENCY RESPONSE AGENCIES

- ▲ Civil Defense
- ▲ Central Fire Station
- ▲ Police
- ▲ Public Works
- ▲ National Guard
- ▲ Air National Guard
- ▲ Green Fire Station
- ▲ Western Fire Station

NAMED ROADBLOCKS

- 1 Hwy Highway 10
- 2 Pioneer Drive
- 3 Waialeale Highway
- 4 Waialeale Highway
- 5 Waialeale Highway
- 6 Waialeale Highway
- 7 Waialeale Highway
- 8 Waialeale Highway
- 9 Waialeale Highway
- 10 Waialeale Highway
- 11 Waialeale Highway
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- 14 Waialeale Highway
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- 16 Waialeale Highway
- 17 Waialeale Highway
- 18 Waialeale Highway
- 19 Waialeale Highway
- 20 Waialeale Highway



Presented by
Harry Kim, Mayor,
Hawai'i County Civil
Defense in First
TARNS Workshop →

INCIDENT: **TSUNAMI WARNING** **WARNING / EVACUATION DATA**

WARNING DISSEMINATION	Date	Time	Completed	EVACUATION DATA	Date	Time
1. Siren Schedule				1. Commence Evacuation		
1st Sounding	_____	_____	_____	Disseminate Information	_____	_____
2nd Sounding	_____	_____	_____	Establish Traffic Control	_____	_____
3rd Sounding	_____	_____	_____	Open Centers / Shelters	_____	_____
_____ Sounding (1 HR TO ETA)	_____	_____	_____	Monitor Field Operations	_____	_____
1/2 Hour to ETA	_____	_____	_____	2. Complete Evacuation		
Zero Hour	_____	_____	_____	Disseminate Information	_____	_____
2. Field Units				Date _____ Time _____		
- Air				Secure Evacuation Area	_____	_____
- Ground				Secure Personnel	_____	_____
- Sea				Monitor Field Operations	_____	_____
				POLICY UPDATE		
3. Media				Entry: _____		
- Radio				Residents: _____		
- TV				Press: _____		
- Printed						
- EBS						



Developed by NDWC after First
TARNS ←

INCIDENT: **TSUNAMI WARNING**

CLOSURES/SHUTDOWNS *

AS OF:

Date

Time

Highways/Roadways

Date

Time

Date
Time
Facilities/Services

***Inform Police Dispatch & Fire Control**



DAMAGE UPDATE

AS OF: _____
Date: _____ Time: _____

1. DISASTER CLASSIFICATION:

Nature Of Disaster: TSUNAMI Date: _____ Time: _____
 Location: HAWAII ISLAND Secondary Threats: _____

2. ESTIMATED CASUALTIES AND DISPLACED PERSONS:

Dead _____ Missing _____ Injured _____ Homeless _____ Evacuated _____ Sheltered _____

3. ESTIMATED PRIVATE PROPERTY DAMAGE:

	Residence	Business	Agriculture	Utilities	Other	Totals
Minor						
Major						
Destroyed						
Total Cost						

4. ESTIMATED PUBLIC PROPERTY DAMAGE:

	Buildings	Schools	Roads	Bridges	Water / Sewer	Other	Totals
Minor							
Major							
Destroyed							
Total Cost							

5. ESTIMATED GRAND TOTAL PRIVATE & PUBLIC PROPERTY DAMAGES: _____

SOUTH HILO/PUNA DISTRICT BOUNDARY POHOIKI





ROADBLOCKS

- 1. Highway 110, Hilo
- 2. Highway 110, Puna
- 3. Highway 110, Puna
- 4. Highway 110, Puna
- 5. Highway 110, Puna
- 6. Highway 110, Puna
- 7. Highway 110, Puna
- 8. Highway 110, Puna
- 9. Highway 110, Puna
- 10. Highway 110, Puna
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- 19. Highway 110, Puna
- 20. Highway 110, Puna





Standard Operating Procedures (SOP) Development

Hawaii Department of Health "No Burn" Declaration Advisory

May 1, 2008

The Department of Health is prohibiting open burning and agricultural burning for the following districts of the Big Island:

South and South Hilo
Hilo
Paeo
South and South Kohala
Ka'u

The "no burn" declaration is being issued due to the occurrence of widespread volcanic haze. The "no burn" period for the island of Hawaii is applicable from Monday, May 1, 2008 until noon May 2, 2008.

This declaration prohibits any open burning, both on volcanic terrain, including all agricultural burning and backyard rubbish fires. Smoking fires are not affected by this prohibition.

Furnaces in the Kona district with an operational burning permit are allowed to burn during this time when the VCGI appears light. The Bureau is required to call the DCH on the day of the burn to obtain clearance to burn. The fire department is notified of the burning either by the DCH or by the burner directly. If the County of Hawaii has declared a burning permit for the area because of a fire condition, the county may prohibit the burner from burning on that day.

If you have any questions, please feel free to call:

Ed Tomaszewski, DCH, Chief Air Branch - Hilo
1162 Kamehameha Highway
Hilo, Hawaii 96720
(808) 933-0401 or 933-1272

Media: Colin
Notes: SOA, Health Advisory at 8:00 am, 1:00
Visibility: Hilo, Hilo

FLOODING
HIGH SURF
HIGH WIND
ADVISORIES

HAWAII COUNTY CIVIL DEFENSE AGENCY
120 Marine Drive
Hilo, Hawaii 96720
Telephone: (808) 933-0221 FAX: (808) 933-5442

FACSIMILE COVER SHEET

TO: _____
Police Dispatch (128)
Fire Dispatch (115)
Merry Lane, P. A. M. Maintenance (116)
Stanley Makikona, DCH, Highway Division (123)
Department of Water Supply (124)

FROM:

Tim M. Kinosh, Civil Defense Administrator

DATE:

May 1, 2008

SUBJECT:

DCH - No Burn Declaration

This consists of _____ page(s), including this page. If there are any problems in receiving this fax, please contact Me or Deanna at 935-5501.

This original is being transmitted via U.S. Postal Service.
This original is being transmitted via Departmental mail.
This original is to be provided upon your request.

Hawaii County is an equal opportunity provider and employer.

FLOODING
HIGH SURF
HIGH WIND
NOTIFICATIONS



Mitigation Measures



Zoning



Building Code

Educational programs



Educational programs

HO'OMĀKAUKAU

"Get Ready"

TSUNAMI PREPAREDNESS INFORMATION

Tsunamis are Hawaii's number one natural disaster killer, but if you learn and follow a few simple rules you can save your life and the lives of those around you - at home, at work, or at play - the next time these giant waves crash onto Hawaii's shores.

Often the first sign of an approaching tsunami is the ocean receding from beaches and harbors. If you are at the shoreline and see this phenomenon, move inland to higher ground immediately. A destructive and potentially deadly wave may follow in less than a minute.

A distant tsunami, one that is generated thousands of miles from Hawaii, may allow as little as three hours for the evacuation of coastal areas.

A locally generated tsunami, one caused by an earthquake or underwater landslide near Hawaii, may allow only minutes to evacuate. If you are near the shore and feel the ground shaking, move inland to higher ground as quickly as possible.

When a Tsunami WARNING is issued, emergency sirens will sound. Radio and TV stations will carry official shoreline evacuation instructions through the Emergency Alert System. Check the Tsunami Evacuation Maps on the following pages. If you are in an evacuation zone when the warning sounds, be prepared to move inland or, if you have access to a concrete and steel reinforced building, which is six stories or more in height, move to a location on the third floor or higher.

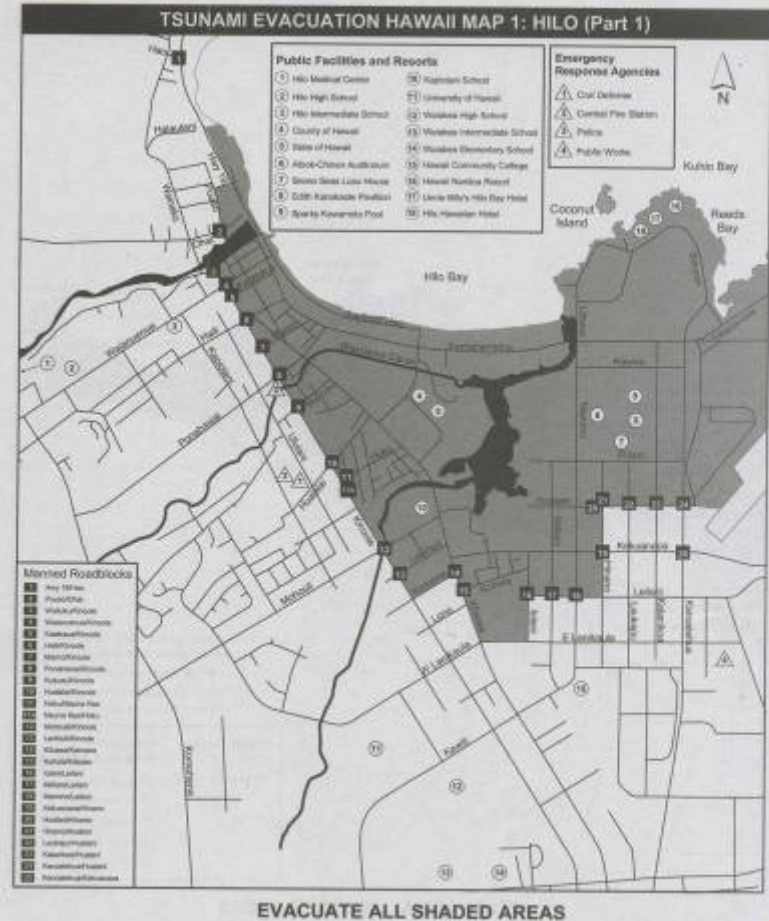
To avoid traffic gridlock, you may want to walk out of the evacuation zone and then wait for further instructions.

If you are outside the evacuation zones, avoid nonessential travel. Do not use your telephone or cell phone except for emergencies.

All public schools in tsunami evacuation zones have emergency evacuation plans in place in the event of a Tsunami WARNING. Following the evacuation, you will be notified when and where to pick up your children.

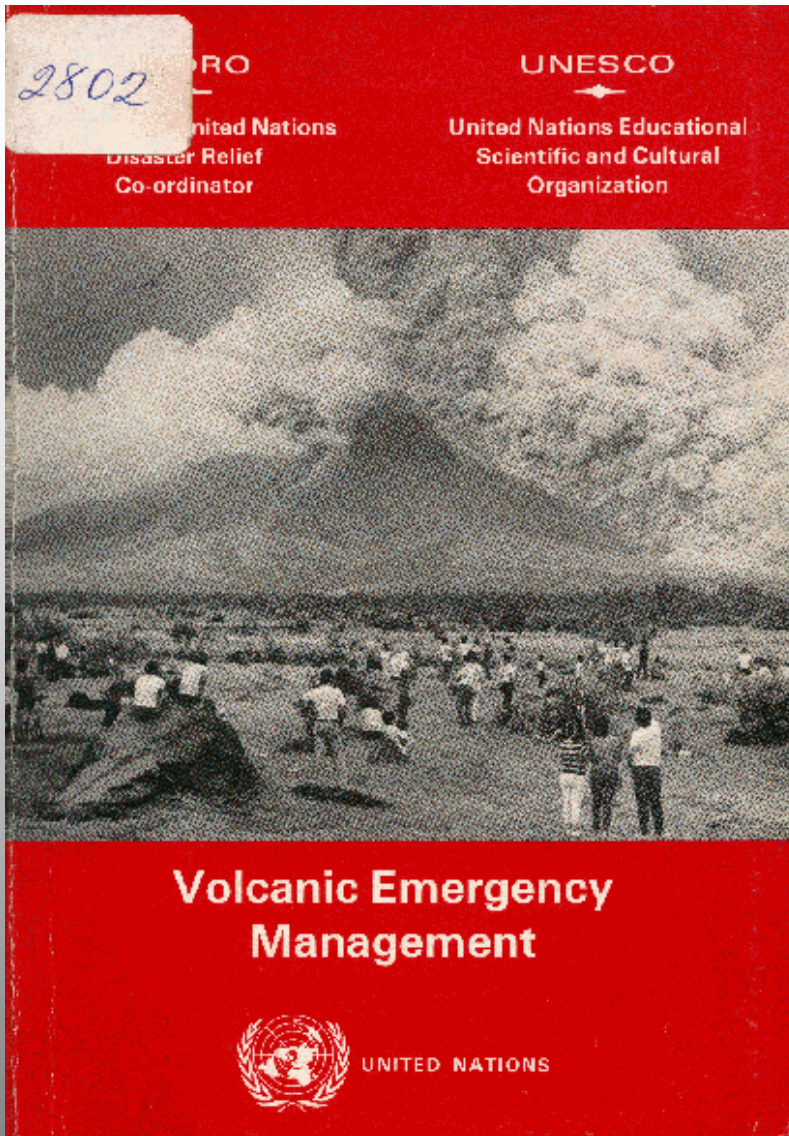
Civil Defense urges all businesses, private and governmental offices, private schools, and care centers in tsunami evacuation zones to develop and maintain tsunami evacuation plans.

The tsunami evacuation maps on the following pages are based on data from the tsunamis that hit Hawaii in the past and represent the best information available at this time. State Civil Defense, in partnership with the University of Hawaii, is currently updating the evacuation maps using the latest scientific techniques and technology. That project may take several years. We urge everyone to apply common sense when using these maps. If you live just outside an evacuation zone - marked as a shaded area on the map - prudence would dictate that you consider evacuating during a tsunami warning.



Educational programs





http://www.crid.or.cr/crid/CD_Volcanes/pdf/eng/doc2802/doc2802.htm



Mahalo