UNESCO/IOC – NOAA ITIC Training Program in Hawaii (ITP-Hawaii)
TSUNAMI EARLY WARNING SYSTEMS
AND THE PACIFIC TSUNAMI WARNING CENTER (PTWC) ENHANCED PRODUCTS
TSUNAMI EVACUATION PLANNING AND UNESCO IOC TSUNAMI READY PROGRAMME
7-18 August 2023, Honolulu, Hawaii USA

Learning Activity –
What Happens When during an event
Tsunami Warning Chain

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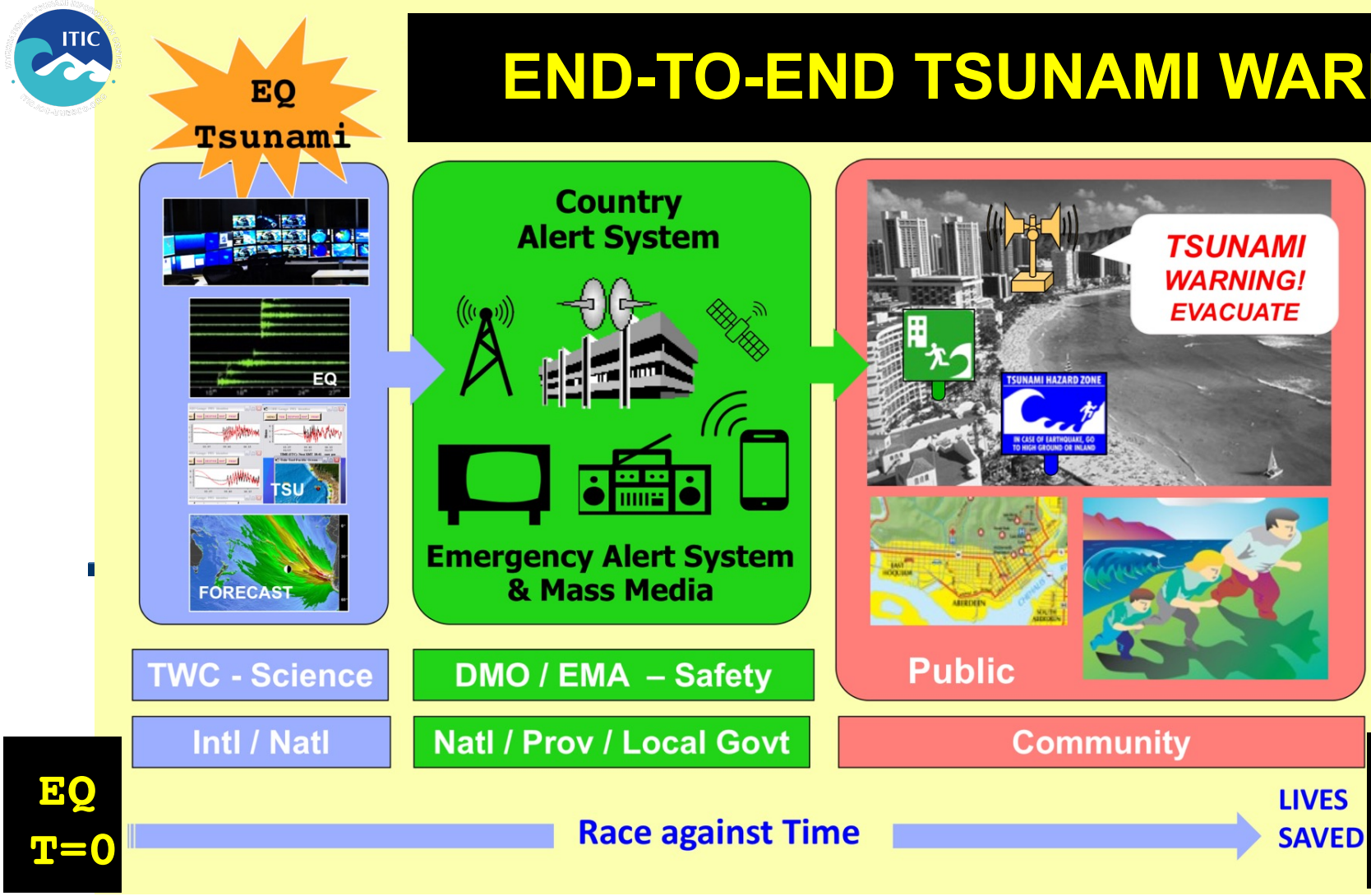
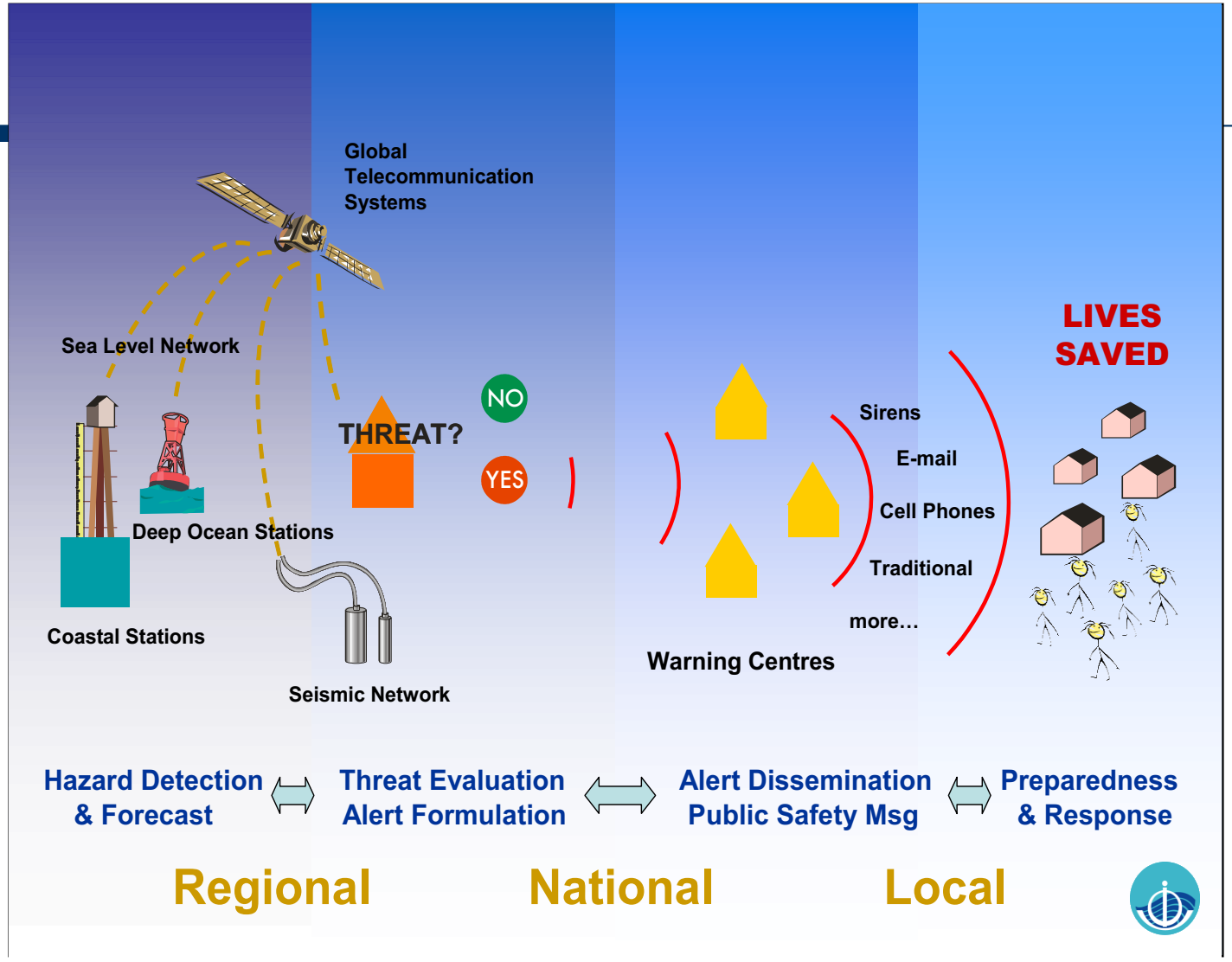
END-TO-END TSUNAMI WARNING




Global
Telecommunication
Systems
Sea Level Network
Deep Ocean Stations
Coastal Stations
Seismic Network
THREAT?
NO
YES
Warning Centres
Sirens
E-mail
Cell Phones
Traditional
more…
LIVES
SAVED
Hazard Detection
& Forecast
Threat Evaluation
Alert Formulation
Alert Dissemination
Public Safety Msg
Preparedness
& Response
Regional
National
Local

Activity – What Happens and When?

- Put activities in chronological occurrence
- Work Individually – 20 min
- Plenary Discussion – 40 min

LEARNING ACTIVITY: TSUNAMI EVENT CHRONOLOGY
TSUNAMI WARNING TIMELINE: WHAT HAPPENS AND WHEN DOES IT HAPPEN?

During the occurrence and unfolding of a local tsunami event, reaction time is of the essence. Put the following activities in order of chronological occurrence from 1 to 24 for a local / regional tsunami scenario. Some activities may occur nearly simultaneously. Assume power and communications are still operable after the strong earthquake.

Each major activity undertaken by government should be described by an SOP.

_____ Drop, Cover, and Hold (Protect yourself from earthquake shaking damage)

_____ Earthquake is detected by a seismic station

_____ Centroid Moment Tensor (Earthquake Mechanism) calculated (TSP, USGS, NTWC)

_____ Expected Tsunami Wave Height forecast using actual earthquake mechanism (TSP)

_____ National Press Conference

_____ Initial Magnitude calculated (Mwp, M_{JMA}, M_L, M_b)

_____ TSP issues initial threat message

_____ Search and rescue operations begin

_____ National Tsunami Warning Center (NTWC) cancels Tsunami Warning

WHAT HAPPENS WHEN activity

_____ Drop, Cover, and Hold (Protect yourself from earthquake shaking damage)
_____ Earthquake is detected by a seismic station
_____ Centroid Moment Tensor (Earthquake Mechanism) calculated (TSP, USGS, NTWC)
_____ Expected Tsunami Wave Height forecast using actual earthquake mechanism (TSP)
_____ National Press Conference
_____ Initial Magnitude calculated (Mwp, MJMA, ML, Mb)
_____ TSP issues initial threat message
_____ Search and rescue operations begin
_____ National Tsunami Warning Center (NTWC) cancels Tsunami Warning
_____ Deep-ocean instrument pressure sensor (DART or other) shows 2 cm signal

_____ Coastal sea level sensor(s) show 5 m zero to peak
_____ Expected Tsunami Arrival Times calculated (TSP, NTWC)
_____ Strong earthquake is felt
_____ DMO or Authority issues Evacuation order
_____ TSP issues final message
_____ Telephones at National TWFP/NTWC/DMO start ringing
_____ All-Clear issued allowing Public to return to tsunami evacuation zone
_____ Evacuation of coastal areas
_____ NTWC/DMO issues Tsunami Warning
_____ NTWC, TSP post-event evaluation
_____ Public moves quickly to higher ground (self-evacuates)
_____ Media disseminate Tsunami Warning Broadcast
_____ Sirens sounded
_____ TSP issues Enhanced Graphical Products
_____ Road clearing/debris removal begins

WHAT HAPPENS WHEN ITP-HAWAII 2023

__2__	Drop, Cover, and Hold (Protect yourself from earthquake shaking damage)
__1__	Earthquake is detected by a seismic station
__8__	Centroid Moment Tensor (Earthquake Mechanism) calculated (TSP, USGS, NTWC)
__9__	Expected Tsunami Wave Height forecast using actual earthquake mechanism (TSP)
_13__	National Press Conference
__3__	Initial Magnitude calculated (Mwp, MJMA, ML, Mb)
__7__	TSP issues initial threat message
_13__	Search and rescue operations begin
_12__	National Tsunami Warning Center (NTWC) cancels Tsunami Warning
_10__	Deep-ocean instrument pressure sensor (DART or other) shows 2 cm signal
__6__	Coastal sea level sensor(s) show 5 m zero to peak
__4__	Expected Tsunami Arrival Times calculated (TSP, NTWC)
__1__	Strong earthquake is felt
__5__	DMO or Authority issues Evacuation order
_14__	TSP issues final message
__4__	Telephones at National TWFP/NTWC/DMO start ringing
_15__	All-Clear issued allowing Public to return to tsunami evacuation zone
__5__	Evacuation of coastal areas
__5__	NTWC/DMO issues Tsunami Warning
_16__	NTWC, TSP post-event evaluation
__3__	Public moves quickly to higher ground (self-evacuates)
__5__	Media disseminate Tsunami Warning Broadcast
__5__	Sirens sounded
_ 11_	TSP issues Enhanced Graphical Products
_13__	Road clearing/debris removal begins

Each major activity should have an SOP

__1__ Strong earthquake is felt

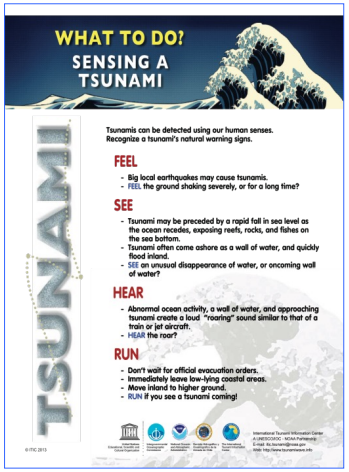
__2__ Protect yourself from earthquake (Drop, cover, hold)

__3__ Public moves quickly to higher ground

__7__ Rapid sea level change = Tsunami arrives

Local Tsunami SOP for public

- ***Know, Recognize, React to Natural Warning Signs***
- ***Feel, Hear, See, Run***



__3__ Public moves quickly to higher ground

__4__ NTWC issues Tsunami Warning / RTSP issues msg

__5__ Sirens sounded

__5__ Media issues Tsunami Warning Broadcast

__5__ DMO or Local Authority issues Evacuation

Each major activity should have an SOP

DMO SOP for Evacuation

- ***Decide if community threatened***
- ***Issue public safety action (evacuate) by multiple methods***
  (voice, text, siren, video)
- ***Enable Coastal Evacuation***
  (roadblocks, evacuation routes, designated safe areas buildings)

Thank You

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