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Developing SOP Templates to Develop General Roles and Responsibilities and Timeline of Processes and Actions (Criteria for Action, Evacuation Checklists, Information Dissemination, Media Information)

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ICG Indian Ocean Tsunami Warning & Mitigation System SOP Workshops July 2023:
Standard Operating Procedures (SOPs) for
National Tsunami Warning Centres (NTWCs) and
Disaster Management Organisations (DMOs)

Overview

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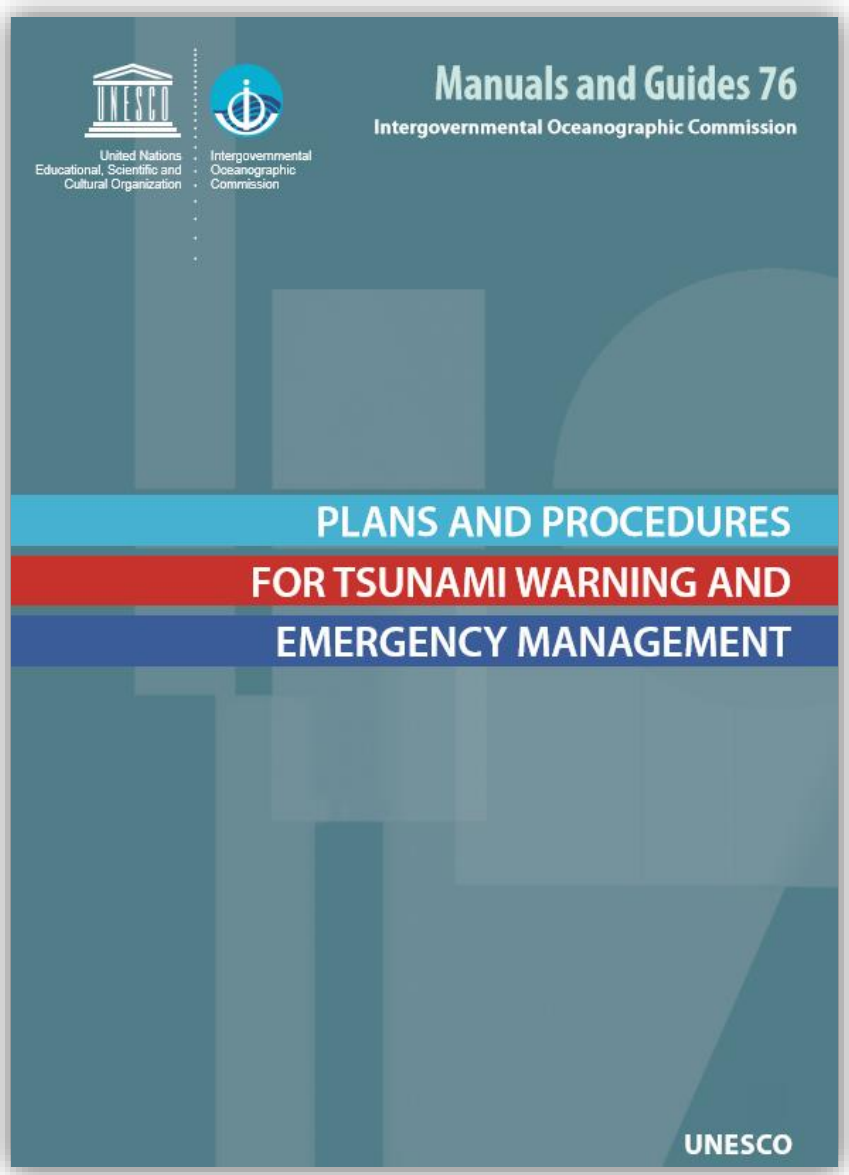
1. National Tsunami Warning and Emergency Response Plan
2. Stakeholders, roles and responsibilities
3. End-to-end tsunami warning and response steps
4. Developing Standard Operating Procedures (SOPs)
5. Competency training

Reference



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www.ioc-tsunami.org

1. National Tsunami Warning and Emergency Response Plan

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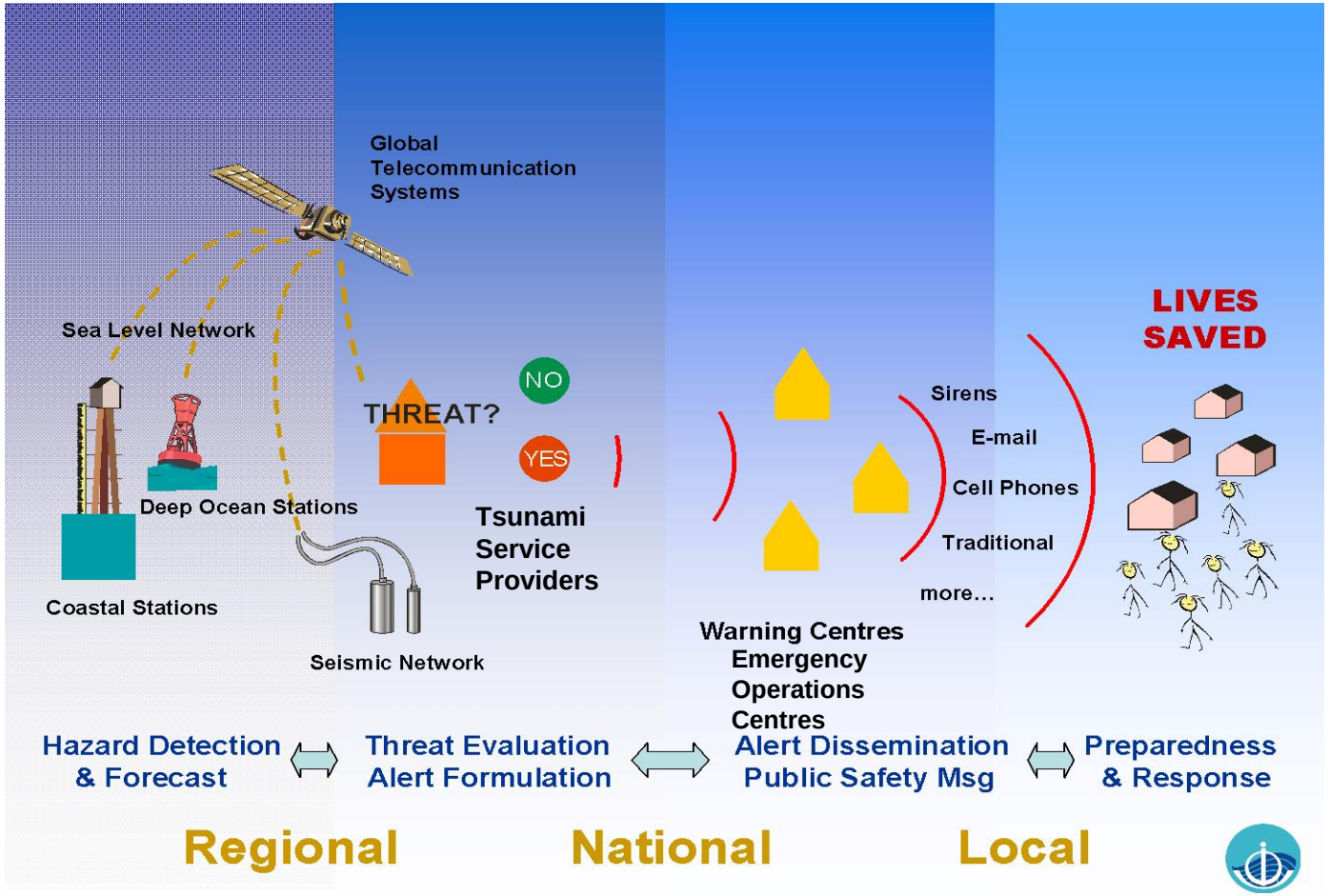
Overview:

Describes the collective components of the Tsunami Warning System (TWS) and the allocation of roles and responsibilities and actions for each component.

Also contains the concepts, thresholds, target times, systems, procedures and templates used in the national tsunami warning chain.

Does not include procedures.

1. National Tsunami Warning and Emergency Response Plan



2. Stakeholders, roles and responsibilities

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Stakeholders:

- IOTWMS Tsunami Service Providers (TSPs)
- National Tsunami Warning Centres (NTWCs)
- National/Provincial/Local Disaster Management Offices (NDMO/PDMO/LDMO)/Local Authorities
- Emergency Services (eg fire, police, ambulance, marine rescue,….)
- Broadcast Media
- Public

2. Stakeholders, roles and responsibilities

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TSP Responsibilities:

- ❑ Detect and calculate initial earthquake source information using global and national seismic networks
- ❑ Calculate and provide tsunami threat information according to the ICG endorsed Coastal Forecast Zones (CFZs) in each country through numerical tsunami modelling using the tsunami generating source.
- ❑ Perform tsunami monitoring using the global network of both the deep-ocean tsunami detection buoys and the coastal sea level stations.
- ❑ Provide timely source and tsunami forecast information as guidance to NTWCs for use in preparing and issuing of national tsunami warnings, including end of threat information.
- ❑ Provide timely observed tsunami wave amplitude data for use by other TSPs and NTWCs.
- ❑ Share information in standard formats with other TSPs and NTWCs.

2. Stakeholders, roles and responsibilities

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NTWC Responsibilities:

- ❑ Receive earthquake and tsunami information from TSPs through designated Tsunami Warning Focal Points (TWFPs)
- ❑ Monitor seismicity and tsunamis in real-time (optional)
- ❑ Analyse all information received and assess the national tsunami threat
- ❑ Develop and issue timely warnings or cancellations to DMOs and other stakeholder agencies (and nationally agree if also the public, with community response actions developed beforehand in consultation with DMOs) in accordance with National Tsunami Warning and Emergency Response Plan

2. Stakeholders, roles and responsibilities

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DMO Responsibilities:

- ❑ Receive official tsunami warning and cancellation messages from the NTWC.
- ❑ Conduct decide appropriate response and actions.
- ❑ Communicate/relay the warnings, with community response instructions, via public alerting systems and the broadcast media.
- ❑ Activate appropriate emergency response measures, including deciding and managing evacuations.
- ❑ Communicate the “All Clear” when the threat is over

2. Stakeholders, roles and responsibilities

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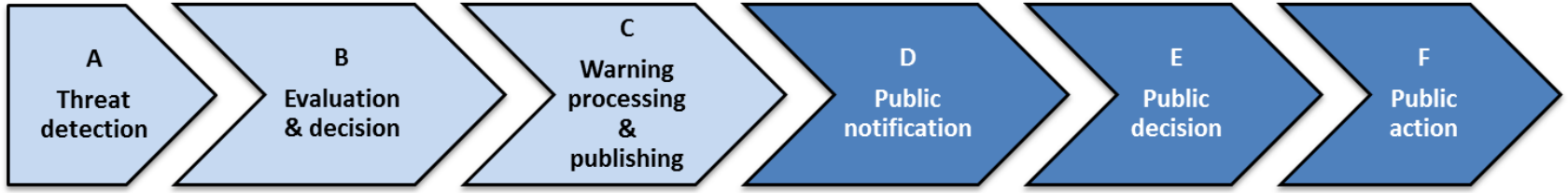
Broadcast Media Responsibilities:

- ❑ Receive official tsunami warning and cancellation messages from the NTWC and/or DMOs.
- ❑ Initiate appropriate response and actions.
- ❑ Communicate/relay up-to-date warnings from the authorities, with community response instructions
- ❑ Keep the public updated with status reports from the authorities
- ❑ Communicate the “All Clear” from the authorities when the threat is over

3. End-to-end tsunami warning and response steps



- Steps A, B involve TSPs and NTWCs
- Steps C, D involve NTWCs and DMOs
- Steps D, E, F involve DMOs
- The over-arching objective is to support effective public action (steps E and F) with timely, authoritative and quality information

3. End-to-end tsunami warning and response steps

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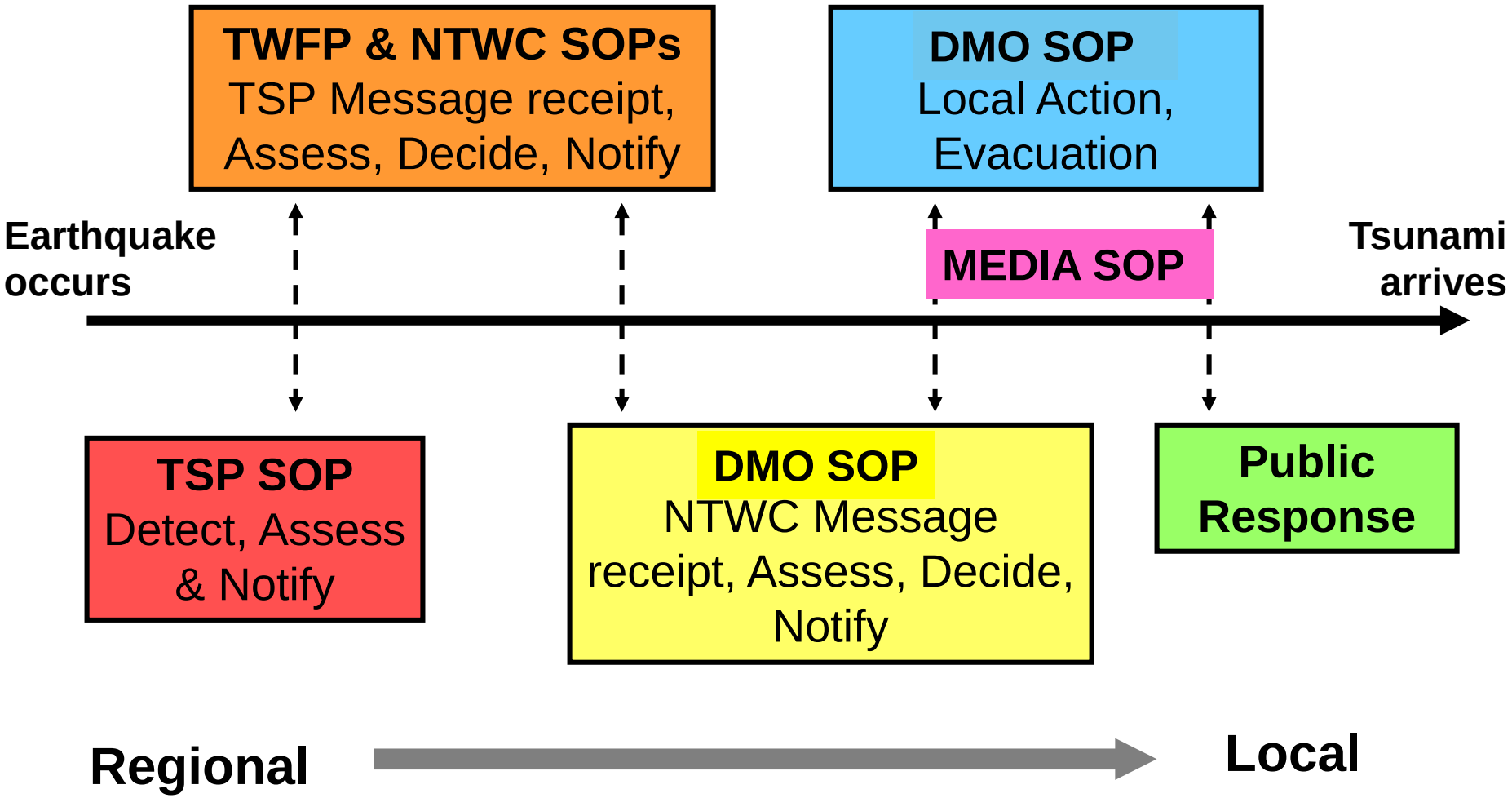
Each step is guided by Standard Operating Procedures (SOPs):

"A description and procedure on agreed steps by institutions used in coordinating who, what, when, where and how for tsunami early warning and response"

3. End-to-end tsunami warning and response steps



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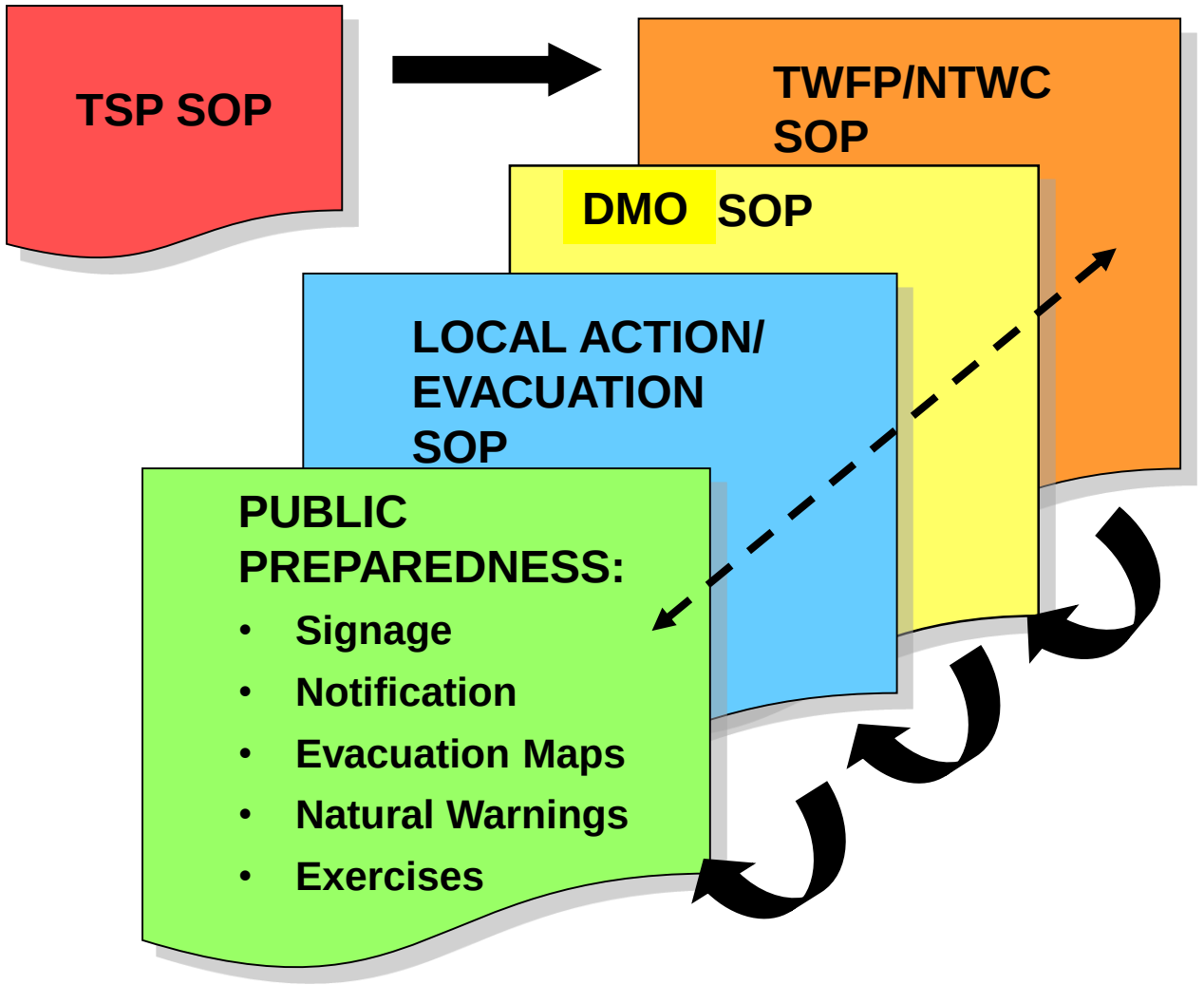
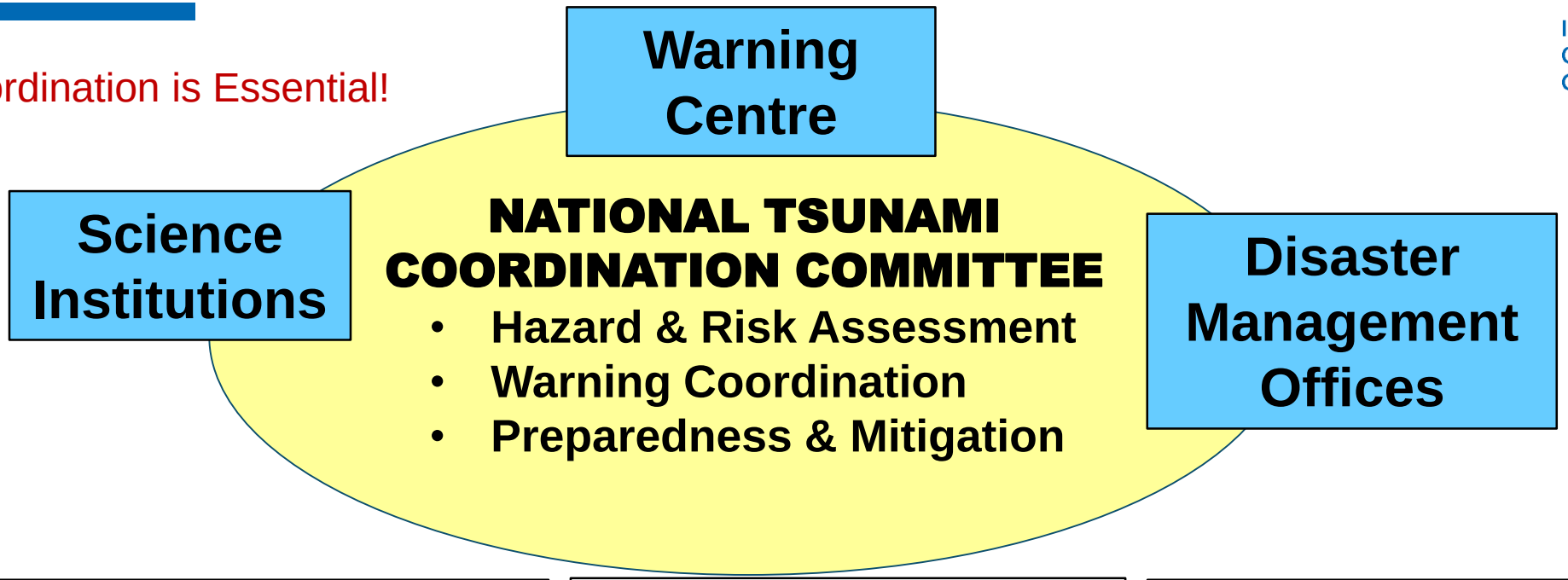


3. End-to-end tsunami warning and response steps

Stakeholder Coordination is Essential!



Civil Society & NGOs:

- Community organisations
- Trade, business organisations
- Disaster response & relief

Government Agencies:

- Planning & Development
- Transportation
- Health & Education
- Coastal Management
- Social Services

Other:

- Media
- Utilities
- Tourism
- International Agencies

4. Developing Standard Operating Procedures (SOPs)

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Why are SOPs important?

- ❑ Foundation of effective, reliable warning systems
- ❑ All warning systems require SOPs, but for tsunami, **rapid** evaluation, warning and response is essential to save lives
- ❑ Ensure best-practice decision-making and helps reduce stress for on-duty staff
- ❑ Required for each stakeholder and major warning and response step
- ❑ Development must be coordinated across each organisation and major step
- ❑ In an end-to-end system, communications links between stakeholders must be robust or warning chain will be broken
- ❑ SOPs should be developed, practiced and modified as necessary – a “living document”

4. Developing Standard Operating Procedures (SOPs)

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Cookbook

1. Use National Tsunami Coordination Committee (or similar) to:
   i. Develop National Tsunami Warning and Emergency Response Plan
   ii. Agree national tsunami warning chain, roles and responsibilities.

1. Construct SOPs for each stakeholder and major step:
   i. Develop overarching Concept of Operations (CONOPS) and policy guidelines document with objectives, expected outcomes, etc
   ii. Develop timelines for actions and decisions
   iii. Develop flow chart / decision tree, including timings
   iv. Develop manual with detailed SOPs for each action and decision
   v. Develop quick-reference SOPs with checklists to use in crisis situation (no time read manual!)

Timelines & Flow Charts

- Describe the actions (what will be done)
- Describe the responsibilities (who will do it)
- Are useful as control tools
- Help define processes
- Reality check if timelines meet required deadlines
- Help with SOP development

Timelines & Flowcharts do not:

- Describe how to do the actions
- (Role of SOPs)

Timeline example NTWC

STEP	TIME since EQ*	ACTIVITY	ACTION AND PROCEDURES
1	1 min	Seismic Alarm Trigger	• Alarm sounds from automated seismic processing system • Feel earthquake and respond, receive phone call or other • For a strongly felt earthquake (greater than Modified Mercalli Intensity Scale VI), alert should be issued immediately to the public and EMA EOC advising to clear the beach
2	2 min	Earthquake Monitoring and Analysis	• Monitor RTED/CISN and other information tools • Receive Information provided by TSP/other Centres • Review/update automatic phase picks and solution. Perform Interactive analysis if required. Highest priority for review is earthquake magnitude and focal depth
3	3 min	Tsunami Threat Assessment	• Obtain ETA by look up in TSP Message • Obtain threat by look up in TSP Message • Calculate tsunami travel times/ETA to nearest coasts or refer to pre-calculated reverse tsunami travel time map ('bullseye' with country as centre • Estimate Threat by o Tsunami Scenario Database look up o Earthquake location, depth, magnitude as proxy for tsunami threat height and area
4	5 min	Issuance of warning and related information	• Use Country Criteria Table to decide on Alert Level. If warning thresholds (for earthquake magnitude or expected tsunami amplitude) are exceeded, issue warning to tsunami-threatened areas immediately. For warning, issue ETAs at forecast points.

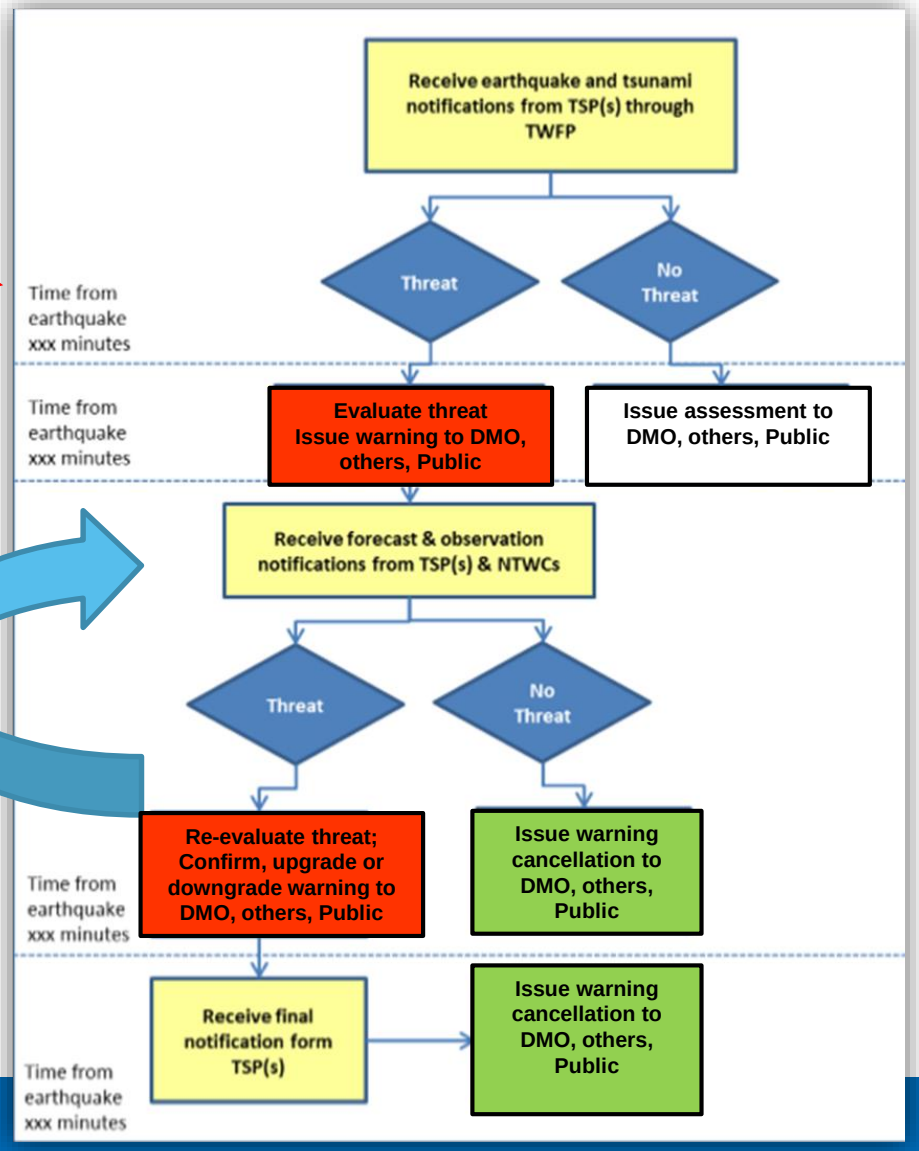
Timeline example DMO

DMO TIMELINE: DISTANT SOURCE TSUNAMI WARNING			
STEP	TIME since EQ*	ACTIVITY	ACTION AND PROCEDURES
1	15-30 min	Receive 1st Warning from NTWC	Consult with NTWC Assess threat Decide response
2	35 min	Public alerting	Prepare applicable alert/message Sign-off Send alert
3	35-50 min	Evacuation	(If applicable): Activate Evacuation Plan
4	35-50 min	Public Info Mgmt	Activate Media arrangement Info on website Info on social media
5	35-50 min	Activate NEOC	Request agency representatives Connect with Local EMAs Prepare communication
6	50 min>	Manage evacuations	(If applicable): Provide shelter/welfare support On-going communication
7	60-80 min	2nd message from NTWC	Consult with NTWC Re-assess Communicate update
etc.	etc.	etc.	etc.

Flow chart example

With timeline

Reassessment loop



NTWC checklist example

NTWC Checklist for Initial Message (simplified)

- [ ] Locate epicentre. Examine location map
- [ ] Review automated solution. Re-pick phases if needed and relocate to finalize
- [ ] Determine depth
- [ ] Determine magnitude (Mwp)
- [ ] Issue Earthquake Information Message (has no tsunami information)
- [ ] Compare solutions from other NTWCs (CISN, USGS, other countries)
- [ ] Select Message Type using Criteria Table
- [ ] Call in other watch-standers to help (if a Warning)
- [ ] Compute ETAs and TTT map (TTT)
- [ ] Run Message Software to create message

Before sending messages, check:

- [ ] Message Number (should be 1)
- [ ] Message Type (Warning, Advisory, Watch, Information, etc.)
- [ ] Which locations placed in Warning/Advisory status
- [ ] Customized information for unusual or unique situations, if needed
- [ ] Earthquake parameters (hypocentre, magnitude, geographic name location)
- [ ] Estimated Tsunami Arrival Times (ETAs)

5: Quality Assurance

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- ✓ Quality assurance of the process that generates the warning
- ✓ Gold standard with **ISO compliance:** ISO 9001 (Australian and India) and ISO 22328-3 (Indonesia)
- ✓ Routinely reviewed for recertification
- ✓ ISO 9001 is defined as the international standard that specifies requirements for a quality management system (QMS). Organisations use the standard to demonstrate the ability to consistently provide products and services that meet customer and regulatory requirement
- ✓ Also monitor performance through Key Performance Indicators, like for TSPs

ISO 22328-3 : COMMUNITY BASED EARLY WARNING SYSTEM FOR TSUNAMI BUILDING A RELIABLE EARLY WARNING SYSTEM

- ISO 22328-3 considered public-private based instrument to accelerate achievement of Tsunami Ready Society (beyond the community, such as businesses, critical infrastructures, etc).
- Developed by Indonesia based on 12 indicators of UNESCO-IOC Tsunami Ready and various lessons learned, with objective to engage and involve private sector and government.
- Private sector can benefit from applying ISO for better market exposure
- Guidelines for (1) Risk Assessment; (2) Dissemination and Communication of Knowledge; (3) Monitoring and Warning Services; (4) Improving response Capability; and (5) Commitment of authorities and community at risk in sustainability of tsunami early warning systems

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The 6th Plenary Meeting of ISO/TC 292, Sydney, 11-16 March 2018

The 11th Plenary Meeting of ISO/TC 292, Virtual, 10 June 2022

5: Competency Training

Competency is defined as “the ability to do something successfully or efficiently”

In time-critical, emergency situations, on-duty staff must competently:

- ❑ Understand the Warning Process
- ❑ Know their and other’s roles and responsibilities
- ❑ Use required tools and procedures
- ❑ Apply the relevant skills and expertise for their position
- ❑ Undertake their duties within the timelines

Must not develop and introduce untested new procedures on the fly

Competency training for each staff member must be conducted regularly

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THANK YOU