



**SOPAC Member Countries  
National Capacity Assessments:  
Tsunami Warning and Mitigation Systems**

**Republic of Marshall Islands**



Republic of Marshall Islands



***SOPAC***

## 5. Assessment Results

### 5.1. Status of Key System Components

The Tsunami Capacity Assessment Workshop results are summarised below in Table 3 in which the status of key components of RMI tsunami warning and mitigation system are outlined (as at the date the Tsunami Capacity Assessment Workshop was held in May 2009, updates between then and the publication of this report are as marked).

**Table 3: Summary of current status of key components of RMI tsunami warning and mitigation system as at May 2009 (updates since then as marked)**

#### Rating

Yes - fully realised
Partially realised
No - not realised

Key Component	Rating	Comment
<b>Authority, Coordination and NGO Role</b>		
Legislation in place for tsunami warnings and response	<b>Yes</b>	Disaster Assistance Act (D3, 1987) covers all hazards. Needs to be updated to reflect advances in DRM from the NAP and review of National DRM arrangements. .
Tsunami coordination committee or effort at a National and local level	<b>Yes</b>	National Disaster Committee (NDC) empowered by legislation to coordinate all emergency situations including tsunami.
Agency responsibilities clearly defined	<b>Yes</b>	WSO, NEMCO and NDC have clear national roles. Island Mayors have clear local responsibilities. Will be further clarified and documented as part of the DRM NAP implementation, review of National DRM arrangements and operational plans for specific hazards.

Key Component	Rating	Comment
<b>Authority, Coordination and NGO Role (Continued...)</b>		
NGOs and Red Cross Society have a defined role in tsunami warning dissemination, preparedness and awareness and emergency response	<b>Partially</b>	<p>Transition for DRM assistance implementation under the COFA from Federal Emergency Management Agency (FEMA) to United States Agency for International Development (USAID) is complete, but not generally recognised.</p> <p>NGOs generally do not have a recognised formal role to support disaster response and preparedness. The Act (D3, 19987) requires NGOs to support emergencies under Office of the Chief Secretary (OSC).</p> <p>NGOs (International Federation of Red Cross and Red Crescent Societies (IFRC), Salvation Army etc.), are based in Majuro and generally play an advocacy role and other assorted services.</p> <p>Civil Society Organisations (Churches, Woman's Groups etc.) undertake a range of roles and may assist with dissemination of warning information and advice.</p>
<b>International and Regional Cooperation</b>		
Country represented at an international and regional level to aid cooperation in tsunami warning and mitigation efforts	<b>Partially</b>	<p>COFA with USA provides WSO and link to PTWC and RMI qualifies for disaster preparedness, response and recovery programs.</p> <p>RMI not a member of IOC and participation in the Southwest Pacific Tsunami Working Group of the ICG PTWS is ad hoc.</p> <p>RMI is a member of Council of Regional Organisations in the Pacific (CROP) agencies and has a number of other interactions with regional and international partners.</p>
<b>Priorities</b>		
Priorities established for implementation of tsunami warning and mitigation system at a National level	<b>Yes</b>	<p>Implementation of priorities identified in this capacity assessment could be realised under the NAP implementation. NAP Task Force has been established.</p> <p>High priority discussion group topics in the Tsunami Capacity Assessment Workshop include:</p> <p><b>Emergency Response Planning</b></p> <ul style="list-style-type: none"> <li>• Strengthen two way communications between Majuro and outer islands</li> <li>• Assess availability of evacuation shelters and advise community (multi-hazard)</li> <li>• Implement use of siren/bell alert systems for tsunami and similar events</li> <li>• Improving capacity to getting help to islands</li> </ul>

Key Component	Rating	Comment
<b>Priorities (Continued)</b>		
<p><i>Continued</i></p> <p>Priorities established for implementation of tsunami warning and mitigation system at a National level</p>	<p><i>Continued</i></p> <p><b>Yes</b></p>	<p><b>Community Awareness</b></p> <ul style="list-style-type: none"> <li>• Collection, printing, publishing (in local language) and distribution (including outer islands) of available material explaining tsunami and advice on actions to take (within multi-hazard approach)</li> <li>• Improve community radio to support community awareness</li> <li>• Make national (and other relevant) plans available to outer islands and local communities to raise understanding of arrangements</li> </ul> <p><b>Risk Assessment and Warning Dissemination</b></p> <ul style="list-style-type: none"> <li>• Research into frequency and potential impact of tsunami on RMI communities with risk and inundation modelling.</li> <li>• Access to existing modelling</li> </ul> <p><b>Interagency Cooperation</b></p> <ul style="list-style-type: none"> <li>• Regional response plan</li> <li>• Develop RMI exercises</li> <li>• Greater level of NAP awareness and ownership by agencies (annual workshops to discuss areas for joint implementation)</li> <li>• All agencies need their own sub-plans or SOPs that support the national plans to improve coordination</li> </ul>
<b>Multi-hazard Approach</b>		
<p>Tsunami warning capabilities are being established within a multi-hazard framework</p>	<p><b>Yes</b></p>	<p>Despite the relative low risk, there is acceptance that tsunami needs to be factored into plans within a multi-hazard approach. Determination of tsunami risk for RMI is seen to be an initial priority.</p> <p>Tsunami will be addressed in a multi-hazard approach as per the DRM NAP.</p>
<b>Research Expertise</b>		
<p>Active research is being undertaken within the country for seismology and tsunami to strengthen the tsunami warning and mitigation system</p>	<p><b>No</b></p>	<p>No active research identified.</p> <p>It is recognised that research specific to RMI is needed, but would need external support.</p>
<b>Tsunami monitoring infrastructure</b>		
<p>Existence of seismograph stations and integration of real time data from these stations into the tsunami warning process</p>	<p><b>Partially</b></p>	<p>One seismic station is in operation on Kwajalein Atoll as part of the global seismic network. This data is not used in real-time within RMI. This station is operated by IRIS/IDA (Incorporated Research Institutions for Seismology/ International Deployment of Accelerometers, 8.8019 167.6130 0.0, Status: Opened, Date Opened: 19991116).</p>

Key Component	Rating	Comment
<b>Tsunami monitoring infrastructure (Continued...)</b>		
Existence of sea level stations and integration of real time data from these stations into the tsunami warning process	<b>Yes</b>	<p>Majuro sea-level gauge is part of the PTWC network. Sea-level data is used by PTWC in real-time to refine warning decisions.</p> <p>University of Hawaii operates a sea-level gauge at Delap, which has a 15-minute reporting frequency.</p> <p>Another sea-level gauge is in place on Kwajalein, supported by PTWC.</p> <p>Data is accessible by WSO for download/viewing using TideTool but need resources/capacity to effectively use.</p>
Sharing of seismic and sea level data internationally to facilitate improvement of PTWC tsunami messages for the region	<b>Yes</b>	All data is available to PTWC.
<b>Warnings</b>		
Nation receives PTWC messages	<b>Yes</b>	PTWC messages are received at WSO Majuro, who relays the information to NEMCO by telephone and e-mail.
24/7 operational staff at warning receipt and dissemination location	<b>Yes</b>	At least one person on duty at all times at WSO Majuro. Extra staff on duty during tsunami and other hazard events.
Disseminate national tsunami warnings as guided by a Standard Operating Procedure	<b>Partially</b>	<p>WSO has tsunami SOPs. NEMCO and NDC do not have tsunami specific SOPs but can apply existing SOPs to multi-hazards.</p> <p>Majuro WSO acknowledges receipt of the message to PTWC and notifies NEMCO. For watches and warnings the information is escalation to the Chief Secretary and President. Majuro WSO seeks sea-level data confirmation from PTWC as well as a local readout that a tsunami has been generated before any warning is issued. The NDC is convened. WSO and NEMCO translate warnings from technical into layman terms. The Ministry of Internal Affairs translate warnings into Marshallese for public radio broadcast. NDC advise Cabinet to issue warning and evacuation Presidential order. This is relayed to appropriate agencies and the public.</p>
System redundancies in place for receipt of PTWC messages and dissemination of National warnings	<b>Partially</b>	<p>Weather Forecast Office (WFO) Guam is back-up notification source.</p> <p>No redundancies available for national warning dissemination.</p>
Redundant 24/7 methods available for dissemination of warnings to community (e.g. public radio, sirens etc.)	<b>No</b>	<p>Local radio is not 24/7. No sirens or other system in place.</p> <p>Several different methods are required to reach the community, including word of mouth.</p>

Key Component	Rating	Comment
<b>Warnings (Continued...)</b>		
Effective warning dissemination to remote communities	<b>Partially</b>	Local Amplitude Modulated (AM) radio coverage includes outer islands, but does not operate after midnight.
Communications coverage of whole country that is effectively utilised for the dissemination of tsunami warning messages	<b>Partially</b>	Local radio coverage includes the whole country. Telephone system is restricted to only the major islands. High Frequency (HF) e-mail (RANET) is available to island mayors' offices. Very Small Aperture Terminal (VSAT) trials are being progressed to Likiep and Ailinglaplap Atolls. Plan to improve interoperability of current systems is required.
Issue of marine tsunami warnings and guidance for vessels, harbours and ports	<b>No</b>	WSO advises Port Authority of tsunami warnings. Tsunami warnings are currently not issued for marine vessels, harbours and ports.
<b>Emergency Response and Evacuation</b>		
Disaster preparedness and emergency response system has been reviewed and opportunities for improvement and training identified	<b>Yes</b>	DRM NAP (D1, 2007) provided a complete review and plan, and was approved by Cabinet in April 2009. NAP task force has been established.
Tsunami emergency response, evacuation and recovery plan exists	<b>Partially</b>	Multi-hazard national plans exist, but no specific tsunami plan at present.
The designated agency for evacuation is identified and have authority by law	<b>Yes</b>	Under the Disaster Assistance Act (D3, 1987) Section 1007 Cabinet can instruct local authorities to carry out evacuations. NEMCO would be responsible for implementing and coordinating voluntary evacuations (on behalf of NDC and Cabinet) where lead responsibilities have not already been authorised under a plan. In general, Police have a lead role in implementing evacuation orders.
Plans have been made for safe evacuation of population centres including aspects such as maps, routes and signage	<b>No</b>	Pending the results of future risk assessment, authorities intend to develop evacuation plans as part of the DRM NAP (D1, 2007). There are no plans to use tsunami-specific signage at this stage.
Procedures are tested and exercised to improve the response through better planning and preparedness	<b>Partially</b>	Government departments carry out exercises in their areas of responsibility, and participate in international exercises, such as Pacific Wave, on an opportunity basis.



Key Component	Rating	Comment
<b>Emergency Response and Evacuation (Continued...)</b>		
Land use policies and building codes are in place to mitigate against the tsunami hazard	<b>Partially</b>	Building guidelines apply only to government structures. Marshall Islands Development Bank lending policies intend to mitigate against tsunami and storm surge hazard. Increased costs related to stricter building codes are problematic.
<b>Tsunami hazard, vulnerability and risk</b>		
Completion of studies to assess the tsunami hazard in the country or Region	<b>Partially</b>	Country – No. Planned as part of the DRM NAP (D1, 2007) implementation, in line with DRM NAP Action 6.2.2. NAP Goal 6 (Sustainable development of the coastal area) and 8 (linking zoning and building codes to vulnerability to disasters) will specifically address land use issues to reduce vulnerability to all known hazards  Region – Yes. A “Preliminary Study into the Tsunami Hazard faced by Southwest Pacific Nations” (Thomas, Burbidge and Cummins, 2007) and a “Probabilistic Tsunami Hazard Assessment of the Southwest Pacific Nations” (Thomas and Burbidge, 2009) have been completed. These included RMI.
Local risk assessments have been completed for at risk communities	<b>No</b>	As above
Adequate data exists and local inundation modelling has been completed for population centres	<b>Yes</b>	Some high resolution bathymetry exists for Majuro Atoll (refer D5) that has multi-use potential.  The lack of good topographical and bathymetric data has meant that no tsunami inundation studies have been completed.
<b>Public and Stakeholder Awareness, Education and Training</b>		
Measures have been taken to ensure the public understand and take action in the event of a tsunami warning being issued	<b>No</b>	Planned as part of the DRM NAP implementation, subject to risk assessment.
Community level education and preparedness programs exist for tsunami	<b>No</b>	Community capacity building is identified as an important aspect of the DRM NAP.
Training programs for the National media exist for natural hazard and tsunami	<b>No</b>	No in-country programs, except for general guidance on how to provide public information effectively during emergency situations.  A UNESCO program is available.
Training programs exist for officials involved in tsunami warning and response	<b>Partially</b>	DRM training is currently ad hoc and the DRM NAP outlines the need for gap analysis and planning in this area. Training for staff to issue tsunami warnings as well as training for the media is required.