TACOMA REGION
PUGET SOUND MARITIME DISASTER RESILIENCE WORKSHOP

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Executive Summary – Tacoma Maritime Area Workshop

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- Elyssa Tappero, Tsunami Program Coordinator, Washington Military Department
- Tieka Adeogun, Emergency Manager, City of Tacoma
- Seth Storset, Director of Safety, TOTE Maritime
- Amy Gillespie, Deputy Director, Pierce County Department of Emergency Management
- Keven Snyder, Waterway Coordinator, Port of Tacoma
- Tim Lupher, USCG Recovery Planner

Purpose

The Six Maritime Area Workshops were designed to identify specific strengths and gaps in response and recovery planning, build relationships and trust between emergency managers and the marine industry, and to inform development of the Maritime Resilience Framework through the identification of maritime assets, plans, and capabilities available after a major earthquake or tsunami incident. For a full recording of the workshop, please see **link here.**

Overview

Exercise Participation: The Tacoma area workshop hosted 72 public and private stakeholders from a variety of organizations: Emergency Management; City, County, and State Government; Port Authorities and Operators; Public and Private Ferry Lines; Maritime Shipping Associations; Tug, Towing, and Barge Companies; Merchant Mariners; and the US Coast Guard.

Anticipated Earthquake and Tsunami Threats: WA EMD and WA Geological Survey provided anticipated earthquake and tsunami impacts for the Puget Sound Region as well as specific information for the Tacoma Maritime Area.

Local Response to Anticipated Impacts Panel: Specific areas discussed by members from both the maritime and emergency management sectors included concerns from the various sectors, immediate information needs after an incident, and how long will do citizens need to be prepared to be on their own.

All Hands Discussion: A communication and information-sharing discussion was held regarding the Tonga volcanic eruption and tsunami impacts. Information regarding communication tools and gaps were also discussed.

Best Practices: New Tacoma Public Works reporting app capability

Brief Overview of the Maritime Resilience Framework: Development objectives and processes to identify maritime assets and the resilience of those assets was presented.

Puget Sound Regional Catastrophic Preparedness Grant Program
King County Emergency Management
Pacific NorthWest Economic Region
CRDR Center for Regional Disaster Resilience

Tacoma Area Workshop Results

Identified Plans or Planning Initiatives:

- Sector Puget Sound Maritime Transportation System Recovery Plan (MTSR)
- WA Tsunami Mitigation Planning Initiative (Port of Bellingham was first port involved)
- Regional Community Points of Distribution Siting and Planning Initiative RCPGP Open Data
- TOTE has established a response plan based on several scenarios and is exploring options for strategically placing reserve ramps to transfer operations to a new location if needed.
- Pierce County has plans to allow critical infrastructure partners (including the Port) to be a part of their emergency operations center if they need to relocate for safety concerns.
- Pierce County is working on prioritizing critical transportation routes and resource allocation planning.
- WA EMD created Inner Coast and Outer Coast Tsunami Workgroups for planning.

Identified Gaps

- Communications capabilities and interoperability in the event of a large-scale power outage
- The need for the development of regional rapid damage assessment protocols and coordination strategy along with a clearinghouse for reported damage information
- Damage assessments could require specific expertise and resources that may not be readily available
- Prioritization of key transportation routes and where limited resources will go if such an event occurs
- Limited opportunities for maritime and emergency planning partners to regularly meet and update contacts
- Due to staffing constraints, some Ports monitor channel 16 (safety and distress frequency) but do not monitor USCG notice to mariners broadcasts

Recommendations

The following recommendations were developed based on stakeholder comments, presentations, and panel discussions throughout the workshop to help close gaps highlighted:

- Create regular opportunities for maritime stakeholders to coordinate with emergency management planners to build trusted relationships.
- Continue to identify key maritime assets and capabilities that could assist in response and recovery.
- Develop communication and information-sharing strategies to reach maritime stakeholders by maintaining an emergency contact list of cell phone numbers and emails for marine partners, including ports, marinas, terminals, and staff for rapid communications.
- Develop a regional maritime and emergency planning communications working group to identify gaps and improvements across the Puget Sound.
- Encourage the Port of Tacoma and surrounding area to work with WA Emergency Management to develop a tsunami mitigation framework.
- Develop and share coordinated rapid damage assessment plans and capabilities across the region.
- Create a standardized process for sharing assessed damage of critical maritime transportation facilities with key organizations and decision makers.
- Explore resources to host an annual regional maritime resilience exercise to test and update plans.
- Encourage port and maritime stakeholder engagement in critical transportation route and resource planning as part of Piece County catastrophic preparedness planning efforts.

Regional Catastrophic Preparedness Grant Program (RCPGP)
Tacoma Area Maritime Resilience Workshop Report

Project Overview

The Federal Emergency Management Agency (FEMA) provided a Regional Catastrophic Preparedness Grant (RCPG) to King County on behalf of Central Puget Sound partners to address the enormous risk the region faces from a catastrophic earthquake. The purpose of this project is to maximize the ability of the Maritime sector to assist in the disaster response and recovery from a catastrophic earthquake when road, rail, and air transportation may be disrupted for weeks, months, and even years.

Puget Sound waterways provide a means to transport all manner of personnel, goods, and materiel that may be needed to respond to, recover from, and restore the region after a catastrophic earthquake. The RCPG project focuses on six maritime areas across Puget Sound, involves public and private partners from the region and Alaska, and works to identify maritime assets and capabilities that could play a role in response, recovery, and restoration efforts.

Following a catastrophic earthquake, supplying the Puget Sound Region with life-sustaining commodities such as water and food will require a tremendous, coordinated effort. Current planning to supply Community Points of Distribution (CPODs) assumes that resupply will come via land routes over the Cascade Mountains from the east or by air. These delivery routes are not assured due to the significant potential for large landslides to block the few mountain passes, for bridges to collapse, for airfield runways and facilities to be significantly damaged, and for uncertain availability of aircraft.

The Regional Catastrophic Preparedness Grant (RCPG) project focuses on public and private maritime assets in the following six maritime areas of focus in the Puget Sound Region, and also involves stakeholders from the State of Alaska:

Bellingham	Bremerton	Everett
Seattle	Tacoma	Olympia

Workshop Overview

Facilitated by the Pacific Northwest Economic Region (PNWER), the Tacoma area workshop focused on the port and surrounding maritime transportation system assets and capabilities. The workshop was designed to identify specific strengths and gaps in response and recovery planning, build relationships and trust between emergency managers and the marine industry, and to inform development of the Maritime Resilience Framework. A full recording of the workshop can be found at https://kingcounty.gov/depts/emergency-management/emergency-management-professionals/Regional-Catastrophic-planning.aspx

Seventy-two public and private stakeholders attended the workshop from a variety of organizations. Examples of the disciplines represented include:

- Emergency Management
- City, County, and State Government
- Port Authorities and Operators
- Public and Private Ferry Lines
- Maritime Shipping Associations
- Tug, Towing, and Barge Companies
- Merchant Mariners
- U.S. Coast Guard

Workshop Goal: Work to identify maritime assets, plans, and capabilities available that could play a role in response, recovery, and restoration efforts after a major earthquake and subsequent tsunami.

Objectives:

1. Orient stakeholders to maritime supply chain response and Community Points of Distribution (CPOD) concepts.
2. Connect maritime stakeholders with emergency management and supply chain planners across the region.
3. Identify specific rapid damage assessment plans and information sharing protocols and procedures.
4. Elicit information about stakeholder capabilities, practices, and plans that support maritime supply chain response and recovery efforts

Sponsor: Funding for the workshop was provided through a Regional Catastrophic Preparedness Grant (RCPG) funded by the Department of Homeland Security to King County Office of Emergency Management on behalf of the eight-county region that is part of the Regional Catastrophic Planning Team (RCPT).

Workshop Design: A planning team consisting of regional and local stakeholders provided input during several planning meetings on the development of the agenda and by identifying specific speakers and topics for discussion. The planning team included:

- Brandon Hardenbrook, Deputy Director, Pacific Northwest Economic Region (PNWER)
- Sasha Rector, Regional Catastrophic Program Coordinator, King County
- Eric Holderman, Director, Center for Regional Disaster Resilience, PNWER
- Emily Rankin, Program Coordinator, PNWER
- Jeannie Beckett, AICP, The Beckett Group
- Louis Cooper, Port of Tacoma
- Jody Ferguson, Pierce County Emergency Management
- Seth Storset, Tote Maritime
- Tieka Adeogun, City of Tacoma Emergency Management

Workshop Summary

Project Welcome: Brendan McCluskey, Director, King County Emergency Management
As the project lead for the eight-county region, Brendan McCluskey welcomed everyone on behalf of the Regional Catastrophic Preparedness Grant Team. He spoke about the importance of the maritime sector and the need to collaborate with all transportation sectors to better coordinate as

the region prepares for a major disaster. This workshop is the first of many opportunities to strengthen regional relationships and build new partnerships to become more resilient. McCluskey emphasized that regional preparation and restoration is a collective effort.

Host Welcome: John Wolfe, CEO, Northwest Seaport Alliance.
John Wolfe explained that the Northwest Seaport Alliance manages an extensive network of infrastructure throughout Tacoma and Seattle, the two partners in the alliance. As manager of those assets, the Northwest Seaport Alliance is a willing partner in increasing regional resilience. It is not only critically important to increase resiliency for the Puget Sound region but also for the global supply chain as well considering the vast amount of economic activity that moves through the ports. Wolfe recommended holding an annual event to discuss and test plans to ensure that the region remains resilient. He expressed his appreciation for the work that is going into this project and looks forward to continued collaboration on this important topic.

Workshop Introduction and Overview - Sasha Rector, Regional Catastrophic Program Coordinator, King County Office of Emergency Management.
Sasha Rector gave a brief overview of the importance of the project and some background information on regional planning underway. King County is managing the project on behalf of the Regional Catastrophic Planning Team and is working closely with partners in all of the eight counties in the region.

Project Background and Workshop Goals - Brandon Hardenbrook, Deputy Director, Pacific NorthWest Economic Region
Brandon Hardenbrook explained that the Puget Sound Regional Catastrophic Preparedness Project consists of two phases: In Phase One, a series of workshops will introduce stakeholders to disaster risks, review existing response and recovery plans, and discussed assets and capability gaps; Phase Two facilitates development of the Maritime Resilience Framework. The Framework will create an adaptable and usable document that identifies key maritime assets to aid in emergency efforts and resource distribution.

The Tacoma workshop is designed to establish relationships, update current contacts, establish cross-sector trust, and understand roles and responsibilities of key players across the region. Additionally, awareness of relevant technology, such as underwater vehicles, salvage divers, and lessons learned from other disasters, should be spread. Maritime volunteer management is a unique challenge.

Anticipated Earthquake and Tsunami Threats: Alex Dolcimascolo, Subsurface Lead and Tsunami Hazard Geologist, Washington Department of Natural Resources, and Elyssa Tappero, Tsunami Program Coordinator, Washington Military Department
Alex Dolcimascolo provided attendees with an introduction to the geologic processes and effects that produce earthquakes and tsunamis in our region. Tsunamis are waves triggered by large disturbances or displacement of seawater, most often caused by earthquakes but can be produced by landslides, volcanoes, or meteorological events.

The recent Tonga volcanic eruption is an example of a distant source. These events occur at a distance, provide at least some advance warning, and are generally less hazardous. A Local Source event has an impact affecting all of the Pacific Northwest, has little or no warning, limited evacuation time, and is the most destructive.

The Cascadia Subduction Zone (CSZ) is potentially the most destructive local source in our region. The Zone extends 700 miles off our coast, stretches from Vancouver Island to Northern California, and marks where slowly moving oceanic plates slide under North America. The CSZ is the most predictable source in the region, with major events occurring every 300-600 years. The last great rupture (magnitude 8.0-9.0+ with shaking felt for three to six minutes) occurred about 1698. There is a 10-25% chance of a similar rupture within the next 50 years. A tsunami might arrive within 10 minutes to several hours, with the greatest impact on the coast but with serious implications for inner coasts and waterways. Aftershocks could continue for many years and potentially produce tsunamis themselves.

Several crustal faults in the Puget Sound basin are potential local tsunami sources, the Seattle Fault being the largest. Less geologic history is available on these local faults, but a Seattle Fault 7.5 magnitude quake occurred in 900-930 CE. There appear to be at least 2500 years between events of this size.

Dolcimascolo followed with some of the particular tsunami hazards that the maritime community should be aware of including:

- Strong and unpredictable currents
- Water level fluctuations
- Eddies/whirlpools
- Tsunami bores and amplified waves
- Drag--vessels left on land/docks
- Debris
- Scour and sedimentation
- Contaminated water
- Poor decision making
- Dangerous tsunami conditions that can last tens of hours

Tsunami Hazards:

- Strong and unpredictable currents
- Water level fluctuations
- Eddies/whirlpools
- Tsunami bores and amplified waves
- Major damage to transportation infrastructure
- Drag--vessels left on land/docks
- Debris in water
- Scour and sedimentation
- Dangerous tsunami conditions can last tens of hours

Question: It looks like the pattern of earthquakes over the last 10,000 years shows a smaller quake in between the 9.0 What is the likelihood of this 8.0 and how severe would it be compared to a 9.0?
Response: An 8.0 earthquake could still cause a tsunami, but it would not be as hazardous. It could still be very damaging but it depends on where the epicenter is.

Question: Will the tides play a role in how damaging this event will be?
Response: Definitely dependent on the tide, if it were to happen at low-tide it would definitely be less damaging. It is hard to predict what the tide will be so we model it after a high-tide situation for that conservative purpose.

Question: Given the modeling of wave height and velocity have the critical infrastructures been considered? Are major bridges and roads expected to be impacted by the tsunami if not already impacted by the earthquake?
Response: yes, they are Liquefaction and damage will play a role in this.

Question: Would the Puyallup river be affected by the tsunami?
Response: Yes, some shoreline flooding but minimal damage.

Elyssa Tappero, Tsunami Program Coordinator, Washington State Emergency Management Division Maritime Earthquake and Tsunami Hazards in Washington

Tappero touched briefly on the tsunami hazards for harbors and boaters which include strong and unpredictable currents, sudden water-level fluctuations, tsunami bores and amplified waves, eddies and whirlpools, drag on large vessels, debris in the water, scour and sedimentation, and contaminated water and sediment. She showed visuals from the 2011 tsunami in Japan which illustrated these hazards. She also walked through visuals that showed damage in California from the recent Tonga tsunami. There was no reported damage in Washington State.

Tappero then explained the infrastructure and financial impacts that a CSZ earthquake and tsunami would have on the Puget Sound Region. Tsunami waves, liquefaction, and landslides could damage fuel piping systems and pumps; bridges, overpasses, roadway, and other vulnerable transportation infrastructure; and damage port/marina infrastructure and goods, impacting shipping and supply chains. She also gave figures from the 2011 Japanese tsunami which were substantial despite being, arguably, the most prepared country in the world. Japanese officials estimated that 2,126 roads and 56 bridges were damaged, and 28,000+ ships were also destroyed, along with 319 ports.

Unpredictable effects on each waterway and anticipated damage to the following:

- Fuel piping systems and pumps
- Bridges, overpasses, roadways
- Prt/marina infrastructure and goods
- Supply chain issues
- Communication facilities
- Natural gas facilities
- 54 petroleum processing facilities
- 35 known potable water facilities
- Facilities [sea, air, rail, etc.] west of the I5 corridor may suffer complete to severe damage
- 2.5 years to fully restore many bridges, tunnels, and overpasses

Tappero followed this by displaying the HITRAC legend which serves as a color system which indicates the level of damage to infrastructure.

- Warning Levels:

- Warning > Inundating wave possible > Full evacuation suggested
- Advisory > Strong currents likely > Stay away from the shore
- Watch > Danger level not yet known -> Stay alert for more info
- Information Statement > Danger level not yet known -> Stay alert for more info

Local:

- First tsunami warning is feeling the earthquake
- < 3 hours until the first wave arrives, depending on distance to epicenter
- More inundation/severe currents than with distant events
- Greater impact to the coast, but inland waters are also threatened
- Biggest local threat: CSZ

Distant:

- You do not feel the earthquake
- Tsunami alerts are primary warning
- > 3 hours until first wave arrives
- Less inundation and current effect
- Biggest distant threat: Alaska

Tsunami Maritime Response and Mitigation Strategies:

- Focus on the tsunami threat to the maritime community in a specific port, harbor, or marina
- Expands on guidance developed by CA, OR, and AK
- WA additions include sections on:
  - Local risk/guide
  - Site-specific maps of waterways showing inundation, dangerous currents, and modeled minimum water depths
  - Agency roles and responsibilities
  - Harbor specific response and mitigation measures
- First WA Strategy was compiled by the Port of Bellingham, see it at mil.wa.gov/tsunami

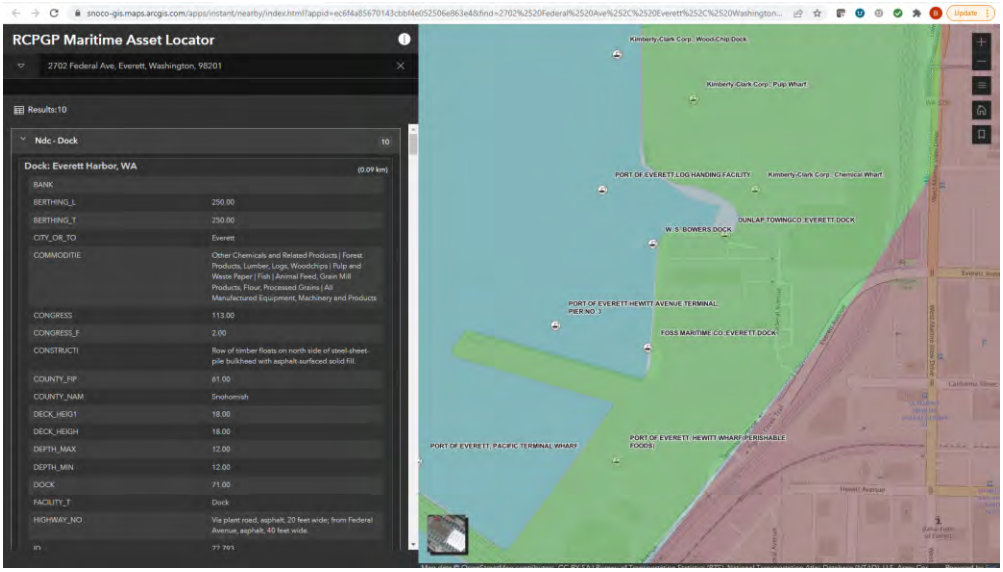
- Official tsunami alert methods:
  - Wireless Emergency Alerts (WEA)
  - Twitter
  - NOAA
  - Marine VHF Radio Channel 16
  - Emergency Alert Systems (EAS)
  - Tsunami sirens

Question: I keep hearing the CSZ is the greatest risk for tsunami. Are crustal faults less concerning for tsunamis?
Response: We have potential evidence that the Tacoma and South Whidbey fault have possibly caused tsunamis in the past but we do not have much evidence to support that right now. I wouldn't discount it.

Question: Will cell phone alerts work after the earthquake has hit? Do we know if those systems are resilient?
Response: Official alerts are primarily for distant tsunamis. For local events the earthquake is your primary warning.

Question: There is a national effort to look at warning categories for weather warnings – making them more understandable to the general public. Is there anything like that happening on the tsunami front?
Response: Yes, the tsunami advisory alert level is part of the NWS' initiative to get rid of the "advisory" alerts in general due to confusion.

Maritime GIS Mapping Capability Planning Resource
Snohomish County Emergency Management and PNWER collaborated to develop an online GIS mapping tool that consists of open source maritime transportation system assets across the Puget Sound. These assets include docks, marinas, boat launches, and other capabilities that could be utilized during response and recovery efforts. This mapping resource can be found online at RCPGP Open Data - Scroll to the area of interest and click "Search this area" to view more detail about the map markers.



Local Response to Anticipated Impacts Panel:

- **Moderator--Eric Holdeman, DirectorCoordinator, Center for Regional Disaster Resilience, PNWER**
- **Tieka Adeogun, Emergency Manager, City of Tacoma**
- **Seth Storset, Director of Safety, TOTE Maritime**
- **Amy Gillespie, Deputy Director, Pierce County Department of Emergency Management**
- **Keven Snyder, Waterway Coordinator, Port of Tacoma**

Eric Holdeman began the discussion by asking the panelists what actions they would take immediately following an earthquake.

Tieka Adeogun responded that her team would immediately start assessing the damage and access to resources. This would include questions such as how they get to the city, can they get to the port, where are the pods located and can they be accessed. Adeogun stated that it would likely take at least a few days to get a full picture of the situation.

Amy Gillespie followed Adeogun's comments and stated that it would also greatly depend on the time of day the event took place, staff safety, condition of facilities, access to the port, medical facilities, fire stations, etc. the priority would be critical transportation and prioritized routes and work with jurisdictions to make sure they can access critical infrastructure and medical facilities and other critical services. That is the key to get resources and life saving measures across the county.

Keven Snyder stated that his team's response depended on the extent of liquefaction, if there are objects in waterways, and the movement is big enough it will determine what is operational. If there is any instability of cranes, then the pilots would not be able to move ships in. The stability of cranes will have an impact on the access of the waterway. This is an important assessment and will take some time. Before anyone touches anything, the Port of Tacoma will need to determine if cranes are stable and if the rail line is intact. If the rail line is not operational, it will cause a backup and not allow movement in or out, similar to if there are cranes in the water. All of this will take time to get a clear picture and is not a quick process.

Seth Storset stated that TOTE would set up their Incident Command System in Tacoma and Anchorage. They have utilized this in smaller scale events. It all depends on what occurs and what impacts each facility. TOTE's business continuity plans are very extensive, and they worked with consultants to establish a response depending on different scenarios. TOTE operates roll on and roll off vessels which are dependent on ramps, but they have the ability to move ramps if needed. The first phase is to assess the ability to operate at the berth followed by looking at where else they can go if required. TOTE has looked at nine different port areas in the lower 48 as possible options, and they can shift operations to another area fairly quickly.

TOTE has done modeling based on many different scenarios. They have not identified a designated location to go to but have options. They are looking at having additional ramps located in another area offsite that could be easily mobilized if theirs is damaged or not accessible. This could help the region be more resilient in the face of a disaster by allowing continued operations at another port facility.

Snyder noted that the port security team will set up an emergency command team to establish communication and some operations footprint on the ground. The security team is located off the water but is still in the tide flats. If the center is not operational, then they will look at county emergency management EOC for operations assistance.

Gillespie added that Pierce County Emergency Management is prepared for their critical infrastructure partners to be a part of their emergency operations center, and if they need to relocate for safety concerns, Pierce County Emergency Management would immediately make plans to accommodate that.

Holdeman asked about the availability of drones for the port to use for damage assessment.

Louis Cooper, Senior Director of Labor Relations at the Port of Tacoma, stated that the port does not have drones, but they have discussed the possibility over the years. Snyder mentioned that some port members have personal drones, but the Port would be hesitant to reach out to them. Holdeman mentioned that some ports have drones that are used for real estate and promotional purposes that could be used for damage assessment in this scenario.

Gillespie identified that she believes prioritization of where limited resources will go if such an event occurs is a gap that needs to be closed and something that should be focused on in the coming year. Cooper mentioned that the port has a similar gap and needs to prioritize resources and capabilities similar to the county and share this information with key partners.

Holdeman then asked whether or not ships headed for ports in the Puget Sound would divert in the event of a catastrophic earthquake. Snyder responded that it would depend on the damages sustained by ports, severity of debris in waterways, and whether or not shipping lines were comfortable sending their assets into such conditions. The pinch point would be how many pilots they have access to and the immediate requests coming from vessels and the shipping lines. Vessels likely would not leave without a pilot.

Tim Lupher, USCG, responded that it depends on the event and where it is located. It takes a while for tugs and ships to get up and running. If cranes are in the waterways it will restrict operations. If there is oil and hazmat in the water the USCG and EPA are the leads. The Coast Guard relies on oil spill response organizations to assist. Life safety will be the priority immediately. The Coast Guard will look at available water assets and move them to assist with life safety.

Question: Can the USCG direct where pilots are assigned?
Lupher: USCG will work with them and it depends on where their pilots are and their transportation availability. They are based out of Port Angeles and are dependent on transportation availability. USCG Priorities would be established, for example a petroleum vessel might be deemed more hazardous and needed to move before a container ship. The pilots would reach out to the USCG to understand the priorities but USCG would not direct them.

Question: Are there alternatives to ports where some maritime operations could commence in and around the Tacoma area, for example; ferry terminal, boat launches, private marinas, docks, etc?
Gillespie: Some success in our catastrophic planning has been around critical transportation planning. One facility we have identified is the steilacoom ferry terminal and some locations for operations in Gig Harbor if the bridges are impacted. The critical transportation work that we are working now will identify some of these areas and explore these further.

Question: What is the best guess on the timeline for federal resources flowing into the region?
Gillespie: Currently, the catastrophic plan for the state is to use the airports in Spokane and Moses Lake as the staging areas. Resources would flow from those airports into airports on the west side. Those resources would make it in about a week. Federal resources would take weeks on the ground.

These are coming from the midwest due to west coast disruptions. Maritime assets would be one to two weeks. These are prepositioned packages of resources that have been identified by the state with FEMA ahead of time.

Holdeman mentioned that the Navy has stated that it would take 8 days to make it up from California and their priority would be on the coast initially. FEMA recently hosted a 3 day session with all federal agencies focused on Cascadia. One of the speakers mentioned that there are land routes as well as plans for air transport of supplies but you really need a maritime presence to get significant aid into the region.

All Hands Discussion: Communication and Information-Sharing Tools
Moderated by Jeannie Beckett, AICP, The Beckett Group
Jeannie Beckett moderated an open discussion around communications and information-sharing tools, focusing specifically on the recent tsunami alerts that were issued following the Tonga Volcanic Eruption. Before the discussion, Beckett asked attendees to respond to a poll asking "Where do you expect to get critical information and updates after an earthquake?" Attendees could choose from City/County EM; Local News outlets; WA Emergency Management Division; U.S. Coast Guard or other. A breakdown of the poll results can be found in Appendix D.

Beckett then began the discussion by asking attendees several questions regarding communications following the Tonga volcano event and subsequent tsunami. She started by asking emergency management representatives to respond first before having the maritime industry representatives and other attendees offer their experiences. Questions for the group discussion included:

- What kind of communication tools did you use during the Tonga event?
- What worked best?
- What needs improvement?
- Were you a part of a team that had communication protocols? Or were you on your own?

Amy Gillespie explained that, during events like the Tonga Tsunami, the duty officer receives a notification from the Washington State EMD. The WA EMD has a procedure that outlines when they receive their notification how to notify local emergency managers and how to start initiating conference calls with the different jurisdictions. Following the event, Pierce County Emergency Management noted one area that could be improved would be to identify and differentiate the way that a tsunami would impact the coast versus the Puget Sound region. One of the successes that resulted from the Tonga response was the Puget Sound entities and counties were able to communicate with each other well. The public information officers got together and coordinated consistent messaging that supported the coastal communities. Pierce County Emergency Management did use a reverse 911 advisory to send out messaging asking citizens to use caution and stay away from coastlines. However, the advisory only went out to people who were signed up to receive that particular kind of information because it was not an immediate warning for Pierce County. There are restrictions on how they can use the reverse 911 system when Pierce County is not under immediate threat. If a warning were being issued, then the reverse 911 system would send the message to all landlines in the county. Residents have to register to receive the alert on their cell phones. Pierce County residents can sign up for these alerts at www.piercecountywa.gov/921/Pierce-County-ALERT. Pierce County Emergency Management would have to coordinate with WA EMD and the cities to determine whether a Wireless Emergency Alert (WEA) was needed.

Elyssa Tappero, Tsunami Program Coordinator, Washington Military Department Emergency Management Division, added that currently the National Weather Service cannot forecast tsunami impacts into the inner coast. WA EMD is working with them on the need to forecast wave arrival times for the inner coast, but they do not currently have the ability. In the meantime, WA EMD does have a joint Standard Operating Procedure so that, in the event of a tsunami warning for the inner coast, they have the ability to send out a WEA on behalf of the National Weather Service. This does not include advisories and watches which is a takeaway that WA EMD learned from the recent Tonga event. Tappero added that, for local events, shaking is the only warning. For distant events, alerts can be deployed, but for local events, the chance to receive an alert in time is limited. For distant events, depending on the source of the tsunami, it could be that the Puget Sound is immediately placed under a warning. This will likely be the case for an event in Alaska as the waves would arrive in less than three hours.

Tieka Adeogun noted that the Tonga event was a good test run because it helped identify gaps that needed to be filled. One such gap that Tacoma Emergency Management discovered was that they did not have the Port of Tacoma's emergency number. They have since rectified that, but she was grateful that they learned that during a non-emergency event. Adeogun also said that they called the marina's emergency officer to put out an advisory to boat owners and operators that there was potential for wave activity. Adeogun acknowledged that the coordination with Pierce County was helpful as Pierce County actually put out the tsunami advisory for the county and made sure that it covered the necessary areas. Tieka also recognized that her department has people out in the field which could be a helpful asset but there needs to be a way for them to report back and identify where else there are gaps that need to be addressed.

Beckett noted gaps she identified following the tsunami event such as public awareness and communication tools so that the public receives the proper information through channels that they actually use regularly.

Tim Lupher explained that the U.S. Coast Guard receives their alerts directly from NOAA. They then pass along the alert to all mariners via Broadcast Notice to Mariners through VHF radio channels.

Louis Cooper said that he and the Port Chief of Security immediately began communicating once they received notice of a possible tsunami and then notified their control center as soon as they had the details.

Alex Wilsie with the Tacoma Fire Department received the NOAA alert and communicated with the Fire Chief and city leadership. Once they realized that the tsunami was not an imminent threat, they just put out a Broadcast to Mariners to pay attention to their boats in the marinas. He noted that they have a fairly good social media presence so they posted information to Instagram, Twitter, and Facebook.

Victor Harris, a ham radio operator from Everett, mentioned he and an acquaintance received alerts from their respective counties at different times. He thinks that it might have been more beneficial for there to be more coordination across jurisdictions on public communications.

John Veentjer, Marine Exchange of Puget Sound, explained that the Marine Exchange received the notice through their employees who were signed up to receive alerts on their phones. He would like

to see the maritime community all have direct communications to the center of the information and not through indirect relays. Not having a direct line of communication leads to miscommunication and missing information. Currently, the Marine Exchange's email and text capabilities are minimal.

Ed Madura, Port of Everett, noted that, while the Port has radios that they use to monitor Channel 16, but they do not monitor the Notice to Mariners Broadcasts. In response to Veentjer's comment about communications, Madura explained that it is challenging for some jurisdictions due to limited staff resources which is something to be aware of for the future.

Sasha Rector identified that she has concerns about alternate lines of communication in the event that internet and phone lines are down.

In the chat:
Dante DiSabatino, WA EMD: It's good to receive alerts in multiple ways, including using a NOAA Weather Radio. Redundancy of alerting methods allows for the most people to be contacted in case some systems are down. These alerting methods are especially important for distant events as we could be impacted by the waves in a matter of hours and not be impacted by earthquake-shaking locally. You can learn more at https://mil.wa.gov/alerts. The Wireless Emergency Alert (WEA) is a system that broadcasts public safety messages (like AMBER Alerts, Earthquake Early Warning Alerts, Tsunami Alerts) over the commercial cellular system and do not require registration. We do ask folks to make sure they are turned on, however. Customers with compatible mobile phones can receive geographically targeted, text-like messages alerting them to threats to safety in their area. All WEA alerts, regardless of type, behave the same. The device makes a distinctive notification sound and vibration, and the message pops up in a text window on the screen.

Best Practices in the Tacoma Region
The City of Tacoma is working with the Pierce County Emergency Management Department to implement a new GIS system that will allow employees to report what they are seeing while in the field to a mobile app to provide an operating picture in real time. This system will encourage employee preparedness, increase vigilance, and support the large role employees have in the department's ability to respond.

Brief Overview of the Maritime Resilience Framework
Presented by David Cruz, Senior Port Planner of Moffat & Nichol

The Maritime Resilience Framework will be a usable document that evolves over time, identifies key maritime assets, and assesses how resilient those assets are. The document will also outline processes and actions to take before, during, and after a large-scale emergency. The purpose of the framework is to incorporate maritime and transportation resources to use, receive, and distribute the sustaining commodities to CPODs with maritime assets in the event of a CSZ or Crustal Fault Event.

Closing Remarks
Sasha Rector, King County Regional Catastrophic Program Coordinator, thanked the attendees for their contributions and their enthusiasm. The upcoming workshops will continue gathering

additional information and identifying gaps, which will inform the specific goals and deliverables that will be incorporated into the Maritime Disaster Resilience Framework.

Recommendations

The following recommendations were developed based on stakeholder comments, presentations, and panel discussions throughout the workshop to help close gaps highlighted.

1. Create regular opportunities for maritime stakeholders to coordinate with emergency management planners to build trusted relationships.
2. Continue to identify key maritime assets and capabilities that could assist in response and recovery.
3. Develop communication and information-sharing strategies to reach maritime stakeholders by maintaining an emergency contact list of cell phone numbers and emails for marine partners, including ports, marinas, terminals, and staff for rapid communications.
4. Develop a regional maritime and emergency planning communications working group to identify gaps and improvements across the Puget Sound.
5. Encourage the Port of Tacoma and surrounding area to work with WA Emergency Management to develop a tsunami mitigation framework.
6. Develop and share coordinated rapid damage assessment plans and capabilities across the region.
7. Create a standardized process for sharing assessed damage of critical maritime transportation facilities with key organizations and decision makers.
8. Explore resources to host an annual regional maritime resilience exercise to test and update plans.
9. Encourage port and maritime stakeholder engagement in critical transportation route and resource planning as part of Pierce County catastrophic preparedness planning efforts.

TACOMA REGION MARITIME DISASTER RESILIENCE WORKSHOP

A Regional Catastrophic Planning Grant Project

Thursday | February 10, 2022, 9:00 am to 12:30 pm
Virtual attendance via Zoom

INTRODUCTIONS | 9:00 AM

Brendan McCluskey, Director of King County Emergency Management, and John Wolfe, Chief Executive Officer of the Northwest Seaport Alliance, will provide opening remarks.

PROJECT OVERVIEW | 9:15 AM

Sasha Rector, Regional Catastrophic Planning Coordinator at King County Emergency Management, and Brandon Hardenbrook, Deputy Director of the Pacific Northwest Economic Region, will give a brief presentation on the project and the workshop goals and objectives. Amy Gillespie, Pierce County Emergency Management, will also brief the next RCPGP project underway in the region.

ANTICIPATED EARTHQUAKE & TSUNAMI HAZARDS | 9:40 AM

Alex Dolcimascolo from WA Dept. of Natural Resources and Elyssa Tappero from the WA Emergency Management Division will provide a briefing of what impacts the Tacoma area can expect when a Cascadia Subduction Zone earthquake occurs.

BREAK | 10:25 AM

LOCAL RESPONSE TO ANTICIPATED IMPACTS | 10:30 AM

Short presentation on GIS map of maritime capabilities in the area, followed by a panel discussion with several key maritime and emergency management partners, including Tieka Adeogun, City of Tacoma; Seth Storset, Tote Maritime; Bob Meyer, Port of Tacoma; and Amy Gillespie, Pierce County Emergency Management. Moderated by Eric Holdeman, Director of PNWER's Center for Regional Disaster Resilience.

FACILITATED DISCUSSION: Communication and Information Sharing Tools | 11:15 PM

Attendees will be invited to join a discussion about how to build connections between the maritime industry and emergency managers and provide for better communication, information sharing, and understanding each partner's roles and responsibilities in the event of a disaster. Moderated by Jeannie Beckett, Principal at The Beckett Group.

BEST PRACTICES IN THE TACOMA REGION | 11:45 AM

Tieka Adeogun, Tacoma Emergency Manager, will brief on a project underway to coordinate with staff in the field to provide live updates to the city's GIS programs in order to have a better understanding of the extent of damage after an earthquake or other disaster.

VISION FOR MARITIME RESILIENCE FRAMEWORK | 12:10 PM

Daryl English and David Cruz from Moffatt & Nichol will brief their upcoming work to develop a Maritime Resilience Framework and invite input from workshop participants on how to keep the Framework updated and relevant and ensure the maritime sector can stay engaged.

ADJOURN | 12:30 PM

Visit our webpage at Kingcounty.gov

King County Emergency Management

Pacific NorthWest Economic Region

CRDR

Puget Sound Regional Catastrophic Preparedness Grant Program

TACOMA REGION MARITIME DISASTER RESILIENCE WORKSHOP

February 10, 2022 | 9:00 am to 12:30 pm

Featured Speakers

BRENDAN MCCLUSKEY

DIRECTOR

KING COUNTY OFFICE OF EMERGENCY MANAGEMENT

Brendan McCluskey is the Director of Emergency Management for King County. King County Emergency Management is responsible for regional emergency preparedness and operations, including mitigation, response, and recovery, and a variety of homeland security matters. Mr. McCluskey oversees all functions of the organization, from planning, to public outreach, to grant management, to operations coordination and EOC operations. McCluskey is the County Executive's representative to the King County Emergency Management Advisory Committee, a designee to the State Emergency Management Advisory Group, and a core member of the Seattle UASI. King County Emergency Management was accredited by the Emergency Management Accreditation Program (EMAP) in 2017. McCluskey got his start as a paramedic for the Newark (NJ) EMS system and became manager of the paramedic service and the EMS training unit. He has been involved with numerous high profile events, including New Jersey's response to 9/11, and has lectured on a number of disaster, infrastructure, and continuity topics.

JOHN WOLFE

CEO

NORTHWEST SEAPORT ALLIANCE

John Wolfe is chief executive officer of The Northwest Seaport Alliance. He sets the organization's vision and strategy, and guides the NWSA's unique customer-focused culture. Wolfe previously served as the CEO of the Port of Tacoma, a position he was named to in 2010. Prior to joining the Port of Tacoma, Wolfe served for two years as the executive director of the Port of Olympia, and before that as Olympia's director of operations and marine terminal general manager. Wolfe also spent 10 years with Maersk Sealand/APM Terminals in Tacoma, most recently as the terminal's operations manager. He is on the boards of the American Association of Port Authorities (AAPA), Executive Council for a Greater Tacoma, Tacoma-Pierce County Chamber of Commerce, the Washington State Fair Board, Federal Maritime Commission's Export Innovation Team and Maritime Innovation Advisory Council for the Department of Commerce. Wolfe is also an executive board member of the Economic Development Board for Tacoma-Pierce County. Wolfe earned a bachelor's degree in business administration from Pacific Lutheran University.

Presenters

ALEX DOLCIMASCOLO

TSUNAMI GEOLOGIST

WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES

Alex is the Tsunami Geoscientist in the hazards section of the Washington Geological Survey. Alex received a B.S. in Geology from Union College (NY) and a M.S. in Geology from Central Washington University. Alex has a research background in tsunami modeling and his Master's thesis work centered on defining a new methodology to characterize earthquake parameters of pre-instrumental tsunamigenic earthquakes. Some of Alex's personal interests include skiing and snowboarding, pick-up soccer, and catching sunsets.

DAVID CRUZ

ALL HAZARDS TECHNICAL LEAD

MOFFATT & NICHOL

David Cruz has more than 40 years of experience as a planner for port-wide studies and maritime facility projects. He has specialized in project management and civil design for port security projects and all hazards' studies. Mr. Cruz is ANSI/ASME certified in Risk Analysis and Management for Critical Asset Protection (RAMCAP). He has international experience including conducting port and rail facilities' assessments in Peru, Chile, South Africa, and Myanmar. Projects he has worked on include: Puget Sound Regional, All Hazards Risk Management/Mitigation Plan, Trade Resumption/Resiliency Plan, and Area Maritime Security (AMS) Assessment, Puget Sound, WA; Port of Tacoma Tideflats Facility All Hazards Assessment; and Area Maritime Security Committee Port-Wide All Hazards Management Plan, Los Angeles and Long Beach, CA.

Panelists

TIEKA ADEOGUN
EMERGENCY MANAGER
CITY OF TACOMA

Shontieka (Tieka) Adeogun is the Emergency Manager for the City of Tacoma within the Tacoma Fire Department. She is a graduate of the Homeland Security Emergency Management Bachelors of Applied Science program at Pierce College. Before working for the City of Tacoma, Tieka was the Emergency Response Plans Coordinator at the Washington State Department of Health. During her time at the Department of Health she was heavily involved in the COVID-19 response where she worked as the Emergency Support Function 8 (public health, medical, mortuary and veterinary services) at the state emergency operations center at Camp Murray, and then was the states site lead at the mass vaccination location in Chelan/Douglas county where they vaccinated over 60,000 people. In 2016, Tieka participated in the 2016 Cascadia Rising exercise. Participating in Cascadia Rising sparked an interest in the roles of planning, training and exercise. She developed her first response plan by supporting Pacific County Emergency Management in drafting their hazardous materials plan. It was after that experience Tieka knew she'd found her place in emergency management. Public outreach and preparedness are close to her heart. Tieka has given countless hours to promoting personal and community preparedness encouraging people to be ready to respond and to take care of themselves whenever the need may arise. Tieka's quote as an emergency manager is *"We have to do what we can to help wherever and whenever it is possible for us to help." -- Jackie Chan* Tieka believes is the essence of emergency management and that helping others should always be the driving force.

SETH STORSET
DIRECTOR OF SAFETY
TOTE MARITIME

Seth Storset brings over 15 years of maritime experience and safety leadership. As Director of Safety, Seth is responsible for Safety, Health, and Environmental for TOTE Maritime Alaska. He oversees long-term strategy and implementation of key programs to ensure everyone at TOTE and our key partners put safety at the forefront of every decision and action. Prior to joining TOTE Maritime Alaska, Seth worked for stevedoring companies in the port of Tacoma and Seattle. In 2015, Seth transitioned to TOTE Maritime Alaska as the Tacoma Terminal Manager and later Sr. Operations Manager to oversee TOTE's safety, operational excellence, customer, and colleague experience. Seth was promoted to Director of Safety in 2018. Seth holds an undergraduate degree in Communications from the University of Washington (2006) and an Executive MBA from the University of Washington's Foster School of Business (2019). He completed an Aviation Safety Management Systems Course at the University of Southern California, Los Angeles, and achieved a Green Belt in Lean Six Sigma from Maersk.

BOB MEYER
DIRECTOR OF PORT OPERATIONS
NORTHWEST SEAPORT ALLIANCE

Meyer joined the Port of Tacoma in 2014 to manage the non-container facilities, a position that transitioned to The Northwest Seaport Alliance when the ports of Seattle and Tacoma formed the marine cargo operating partnership in August 2015. In his expanded role, Meyer directs the operations at all port-operated terminals and rail yards, as well as the NWSA's safety program. Before joining the NWSA, Meyer spent nearly a decade as a merchant mariner and several years with Wallenius Wilhelmsen Logistics, most recently, running WWL's terminal at the Port of Brisbane. Meyer holds a bachelor's degree in marine transportation and business administration from the Maritime Academy.

AMY GILLESPIE
DEPUTY DIRECTOR
PIERCE COUNTY DEPARTMENT OF EMERGENCY MANAGEMENT

Amy Gillespie has over ten years of experience in emergency management. She has led many programs to include alert and warning, emergency operation centers, planning, training and exercises, and recovery. Before joining Pierce County, she spent three years with King County Office of Emergency Management, four years with Pierce County Department of Emergency Management and four years with Washington State Emergency Management. She has lead programs that have attained national recognition to include Child Abduction Response Teams, Emergency Management Accreditation, and Complex Coordinated Terrorist prevention. She earned her FEMA professional certificate from the Emergency Management Advanced Academy. She holds a Bachelor's degree in Political Science from Central Washington University and a Master's Degree from the Naval Post Graduate School Center for Homeland Defense and Security. She also is an International Association of Emergency Managers Certified Emergency Manager.

Facilitators and Moderators

BRANDON HARDENBROOK
CHIEF OPERATING OFFICER
PACIFIC NORTHWEST ECONOMIC REGION

Mr. Hardenbrook's duties include overseeing all PNWER staff and programs in coordination with PNWER's governing board, which includes legislative leadership of each state, province, and territory as well as governors and premiers, and private sector leaders. PNWER's 22 working groups include trade & economic development, energy, border issues, agriculture, invasive species, tourism, disaster resilience, transportation, water policy and others.

ERIC HOLDEMAN
DIRECTOR
CENTER FOR REGIONAL DISASTER RESILIENCE

Eric Holdeman is the Director of the Center for Regional Disaster Resilience (CRDR), which is part of PNWER. His areas of expertise include building regional coalitions between agencies, governments, the private sector and non-profits. Building regional disaster resilience is key to what he does day-to-day. He has also authored numerous articles for professional journals and opinion pieces for local, regional and national newspapers. He is a Senior Fellow, columnist, contributing writer and blogger for Emergency Management Magazine. An experienced and accomplished public speaker, he is sought after to present at national and regional conferences. Eric has the United States' most popular blog on the topic of emergency management at www.disaster-zone.com.

JEANNIE BECKETT
PRINCIPAL
THE BECKETT GROUP

Jeannie's 40 years of expertise in provides her clients with "boots on the ground" knowledge of business continuity, emergency management and the logistics of inland transportation. Ms. Beckett works with agencies and associations to leverage their resources and build economic vitality for their regions. Before starting The Beckett Group in 2009, She had a 25 year career with the Port of Tacoma in leadership positions including Senior Director, Inland Transportation, and Director of Operations. Jeannie has worked on projects that profile the logistics and freight delivery needs, business resiliency and recovery as well as infrastructure resiliency efforts. These projects pinpointed areas of inefficiency in the highway and rail freight delivery systems and the lack of business / infrastructure continuity planning.

Resources

Planning Resources – During the workshop several planning and information resources were mentioned to assist in the planning and coordination after a major disaster. These can be found at--

https://www.cisa.gov/regional-resiliency-assessment-program

Maritime Coordination | RCPGP Hub - Home (arcgis.com)

Alerts | Washington State Military Department, Citizens Serving Citizens with Pride & Tradition

Emergency Management Information portals (wa.gov)

Navy Joint Logistics Over the Shore–
edocs.nps.edu/dodpubs/topic/jointpubs/JP4/JP4-01.6_050805.pdf

National Tsunami Warning and Alert Page https://tsunami.gov/
Washington State Tsunami Resilience Planning and Projects: mil.wa.gov/tsunami

Geologic Information Portal https://geologyportal.dnr.wa.gov/

Tsunami Hazard Maps https://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards/tsunamis#tsunami-hazard-maps

Tsunami Evacuation Maps https://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards/tsunamis#tsunami-evacuation-maps

Tsunami Simulations https://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards/tsunamis#tsunami-simulation-videos

Northwest Association of Networked Ocean Observing Systems (NANOOS) Pacific Northwest - NANOOS - The U.S. Integrated Ocean Observing System (IOOS) (noaa.gov)

Nanoos Mobile Tsunami Evacuation app https://apps.apple.com/bo/app/nvs-tsunami-evacuation/id478984841 or on Android

Tsunami Design Zone Maps for Washington State Building Code
https://www.dnr.wa.gov/wa-td
https://play.google.com/store/apps/details?id=tsunami_evac.nvs.nanoos.org.nvs_tsunami_android

Acronyms

AAR	After Action Report
AHAB	All Hazard Alert Broadcast
CRDR	Center for Regional Disaster Resilience
CPOD	Community Point of Distribution
DHS	Department of Homeland Security
EAS	Emergency Alert System
EMD	Emergency Management Division
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
HITRAC	Homeland Infrastructure Threat and Risk Analysis Center
NANOOS	Northwest Association of Networked Ocean Observing Systems
PNWER	Pacific Northwest Economic Region
RCPG	Regional Catastrophic Preparedness Grant
RRAP	Regional Resiliency Assessment Program
USCG	United States Coast Guard
WEA	Wireless Emergency Alerts